

ABSTRACT

Pincher Creek Regional Landfill (W 8-7-1-W5) was established in September 1968. Groundwater monitoring was initiated in 1987. PINCHER CREEK - CROWSNEST PASS REGIONAL LANDFILL. GROUNDWATER MONITORING REPORT W 8-7-1-W5





SEP 25 1990

ABSTRACT

The Pincher Creek - Crowsnest Pass Regional Landfill (W 8-7-1-W5, near Cowley, experienced migration in September 1978. Groundwater monitoring activities were initiated in June 1982.

PINCHER CREEK - CROWSNEST PASS
REGIONAL LANDFILL
GROUNDWATER MONITORING REPORT
W 8-7-1-W5

The predominant surficial materials are glaciofluvial sands and gravels. The surficial deposits, which range in thickness from 1.5 to 15 m, overlie bedrock assigned to the Tertiary - Upper Cretaceous Strathmore Formation. The in-situ hydraulic conductivity of surficial materials ranges from 10^{-5} to 10^{-3} cm/s. The regional direction of groundwater flow is towards the southeast. In the landfill area, a local flow system trends primarily to the south. It is superimposed on the regional system. Most of the landfill site is located in an area of lateral groundwater flow.

Alberta Environment
Environmental Protection Services
Earth Sciences Division
Groundwater Protection Branch

Prepared by:

W.J. Ceroici
Hydrogeologist

Robert M. Coupland
Senior Technologist
Groundwater Protection Branch

October, 1986

#535

Submitted by:

L.J. McCracken, P. Ag.
Head
Groundwater Protection Branch



Alberta Environment
Environmental Protection Service
Earth Sciences Division
Groundwater Protection Branch

Submitted by:

A. J. Robertson, P. Eng.

Head

Groundwater Protection Branch

Prepared by:

W. J. Carroll

Hydrogeologist

Robert M. Campbell

Senior Technologist

Groundwater Protection Branch

October, 1989

1100

ABSTRACT

The Pincher Creek - Crowsnest Pass Regional Landfill (W₁ 8-7-1-W5), near Cowley, commenced operation in September 1976. Groundwater monitoring activities were initiated in June 1982.

The predominant surficial materials in the study area consist of a Pleistocene sequence of till, glaciolacustrine silts and sands and glaciofluvial sands and gravels. The surficial deposits, which range in thickness from 1.5 to 15 m, overlie bedrock assigned to the Tertiary - Upper Cretaceous Brazeau Formation. The in-situ hydraulic conductivity of surficial materials ranges from 10^{-5} to 10^{-8} cm/s. The regional direction of groundwater flow is towards the southeast. In the landfill area, a local flow system trending primarily to the south, is superimposed on the regional system. Most of the landfill site is located in an area of lateral groundwater flow.

Shallow groundwater chemistry is highly variable ranging from the sodium-bicarbonate to the calcium/magnesium - sulphate/chloride type. Monitoring results suggest that landfilling has had minimal effect on groundwater quality. A slight deterioration in groundwater quality was detected in shallow groundwater near the landfill. This deterioration is commonly found in close proximity to most landfills and does not affect the useability of the water.

Since the landfill has regional status, groundwater monitoring will be continued. Groundwater samples will be collected from selected wells for chemical analysis once annually and water levels will be recorded quarterly.

TABLE OF CONTENTS

	PAGE
ABSTRACT.....	i
TABLE OF CONTENTS.....	ii
LIST OF FIGURES.....	iii
1. INTRODUCTION.....	1
2. SITE DESCRIPTION.....	1
3. MONITORING RESULTS.....	3
3.1 Groundwater Flow.....	3
3.2 Hydraulic Conductivities.....	8
3.3 Groundwater Chemistry.....	8
4. CONCLUSIONS.....	14
5. REFERENCES.....	15
APPENDIX A1 GROUNDWATER PROTECTION BRANCH DRILL LOGS.....	16
A2 MONITORING WELL COMPLETION INFORMATION.....	36
APPENDIX B WATER WELL DATA.....	45
APPENDIX C1 LIST OF PARAMETERS AND PRESERVATION TECHNIQUES.....	52
C2 GROUNDWATER CHEMISTRY ANALYSES.....	53

Digitized by the Internet Archive
in 2016

LIST OF FIGURES

	PAGE
FIGURE 1 LOCATION PLAN.....	2
FIGURE 2 SITE PLAN.....	4
FIGURE 3 HYDROGEOLOGIC CROSS-SECTION A - A ¹	5
FIGURE 4 HYDROGEOLOGIC CROSS-SECTION B - B ¹	6
FIGURE 5 WATER TABLE ELEVATION CONTOURS (1986-06-03).....	7
FIGURE 6 DEPTH TO WATER TABLE CONTOURS (1986-06-03).....	9
FIGURE 7 PIPER PLOT OF GROUNDWATER ANALYSES (1985-06-11)...	10
FIGURE 8 CHLORIDE CONCENTRATION VARIATIONS.....	12
FIGURE 9 SULPHATE CONCENTRATION VARIATIONS.....	13

1.0 INTRODUCTION

A mandate of Alberta Environment is to safeguard against groundwater pollution from waste disposal facilities. To this end, a long term groundwater monitoring program has been established for regional landfills. Data derived from this program are essential for assessing present landfill design criteria, detecting groundwater contamination and in implementing possible correction measures.

This report outlines groundwater monitoring activities at the Pincher Creek - Crowsnest Pass (PC-CP) Regional Landfill located near Cowley at W $\frac{1}{2}$ 8-7-1-W5 (Figure 1). A hydrogeologic investigation of the site was conducted by the Groundwater Protection Branch (Davison, 1977) of the Earth Sciences Division at the request of the Waste Management Branch, Pollution Control Division.

The disposal operation commenced in September 1976 and groundwater monitoring activities commenced in June 1982. Monitoring data are used specifically to define:

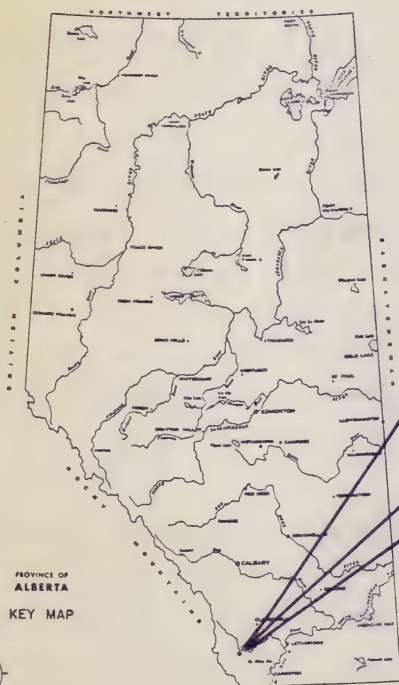
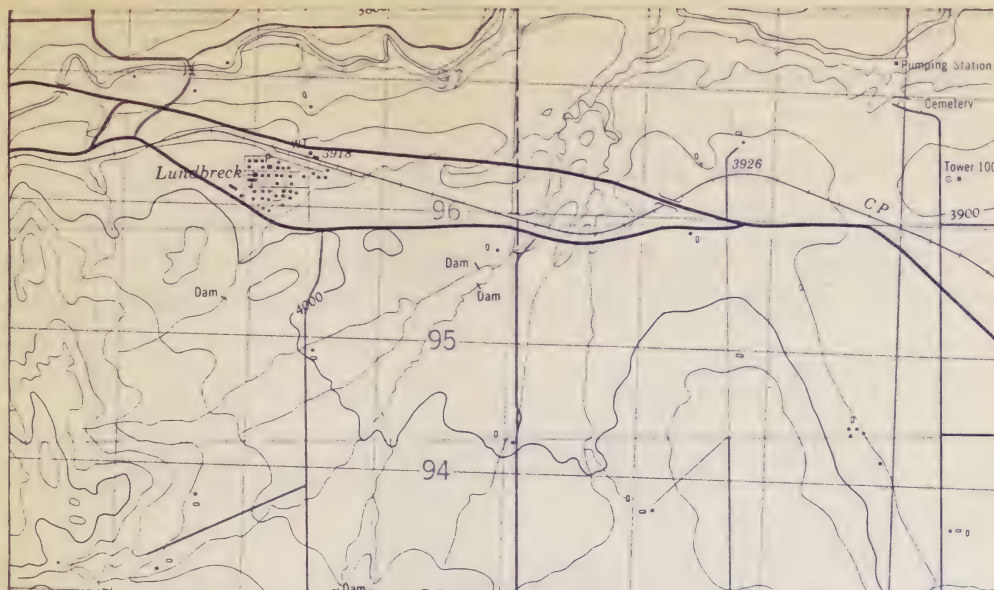
1. The water table configuration and its fluctuations, and;
2. The chemistry of local groundwater and its possible contamination by leachate.

2.0 SITE DESCRIPTION

The landfill site occupies one-half section of agricultural land located 5 km southwest from the Village of Cowley. It is surrounded by cultivated farmland to the south and west and by pastures immediately to the north and east.

The topography of the site ranges from steeply sloping conditions adjacent to a west facing ridge of the Porcupine Hills in the northeast portion, to gently sloping conditions trending southerly throughout the balance of the study area. The maximum topographic relief is 67 m. Surface drainage is well defined with a network of small intermittent streams (draws), discharging toward the southeast.

Rg. 2 | Rg. 1



Tp 7
Tp 6



PC - CP LANDFILL MONITORING STUDY

GENERAL PLAN

WI/2 SEC. 8-7-1-W5

SUBMITTED *R. K. Chandler*
DATE *Apr. 10/87*
APPROVED *R. Chandler*
DATE *April 10/87*

INVESTIGED R.M.C.
CHECKED
DRAWN Y. K. TAM
CHECKED *[Signature]*

SCALE
DATE SEPT. 1986

FIGURE No. 1
DWG. No. M9-Z-1-E-4

The surficial materials covering the area consist predominantly of lacustrine and glacial drift deposits. Overburden thickness ranges from 4 m near the northeast corner to greater than 15 m near the southwest corner of the study area.

The Tertiary-Cretaceous bedrock underlying the landfill site belongs to the Brazeau Formation. According to Green (1972), this formation is mainly non-marine and consists of greenish-grey, thick bedded, chloritic and feldspathic sandstone, and blocky grey mudstone with some tuff and thin coal beds.

Domestic wells in the vicinity of the landfill are completed in bedrock and have an average depth of 85 m. Twenty year safe yields are in the 0.1 to 0.4 L/s range (Tokarsky, 1974).

3.0 MONITORING RESULTS

3.1 Groundwater Flow

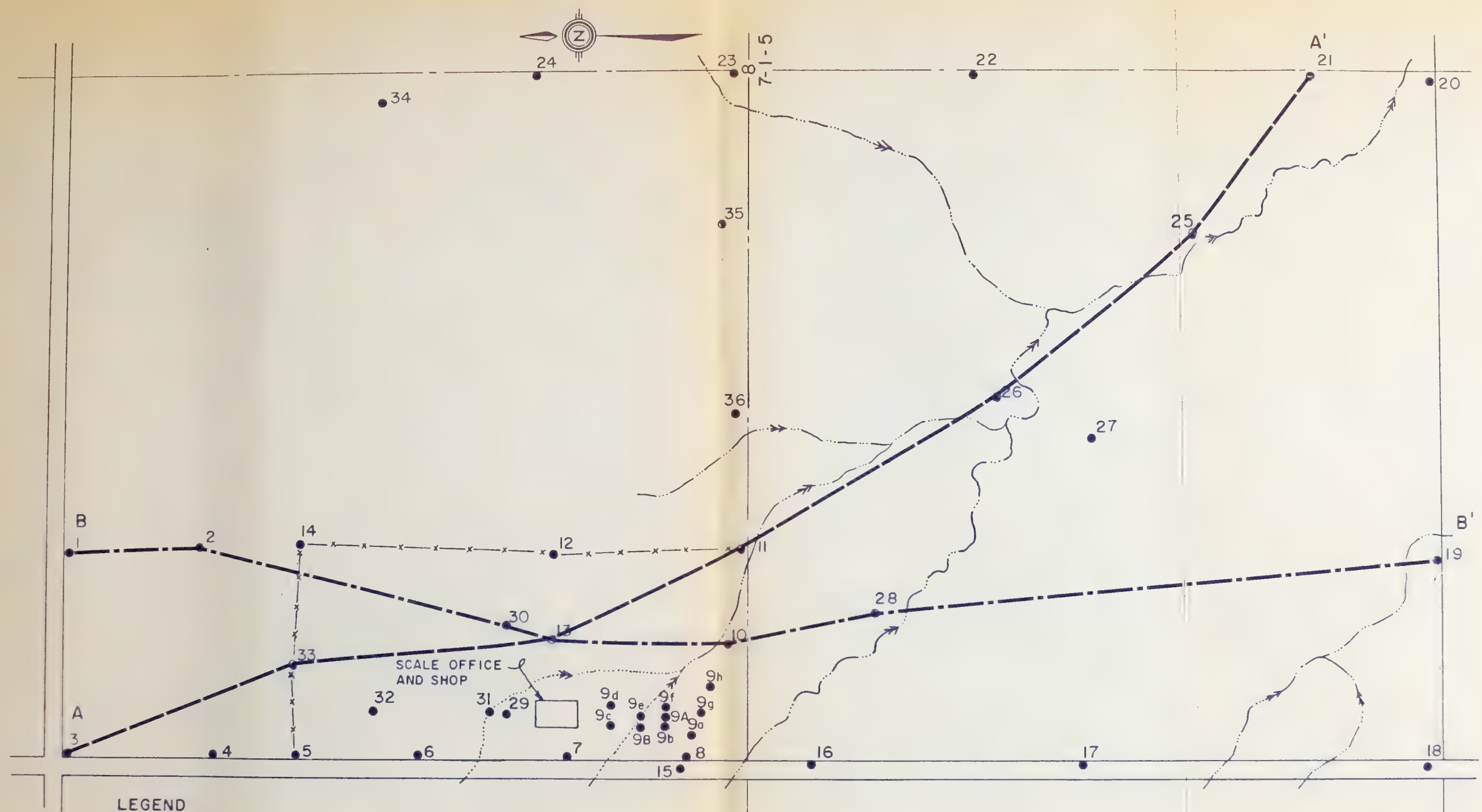
According to Davison (1977), the direction of regional groundwater flow is towards the southeast. In the landfill area a local flow system with flow to the south is superimposed upon the regional flow system.

A detailed plan showing the locations of all instrumentation sites (water table wells and piezometers) in the study area is presented in Figure 2. Test hole lithologies and completion data are contained in Appendix A1 and A2, respectively. Lithologic data were used to construct the hydrogeologic cross-sections depicted in Figures 3 and 4.

Water level data are contained in Appendix B. Measurements from water table wells recorded on 1986-06-03 were used to construct the water table contour map in Figure 5. The map indicates that the predominant direction of shallow groundwater flow is to the south. The average hydraulic gradient across the site, taken from water table well #24 to #27, is 2.4×10^{-2} .

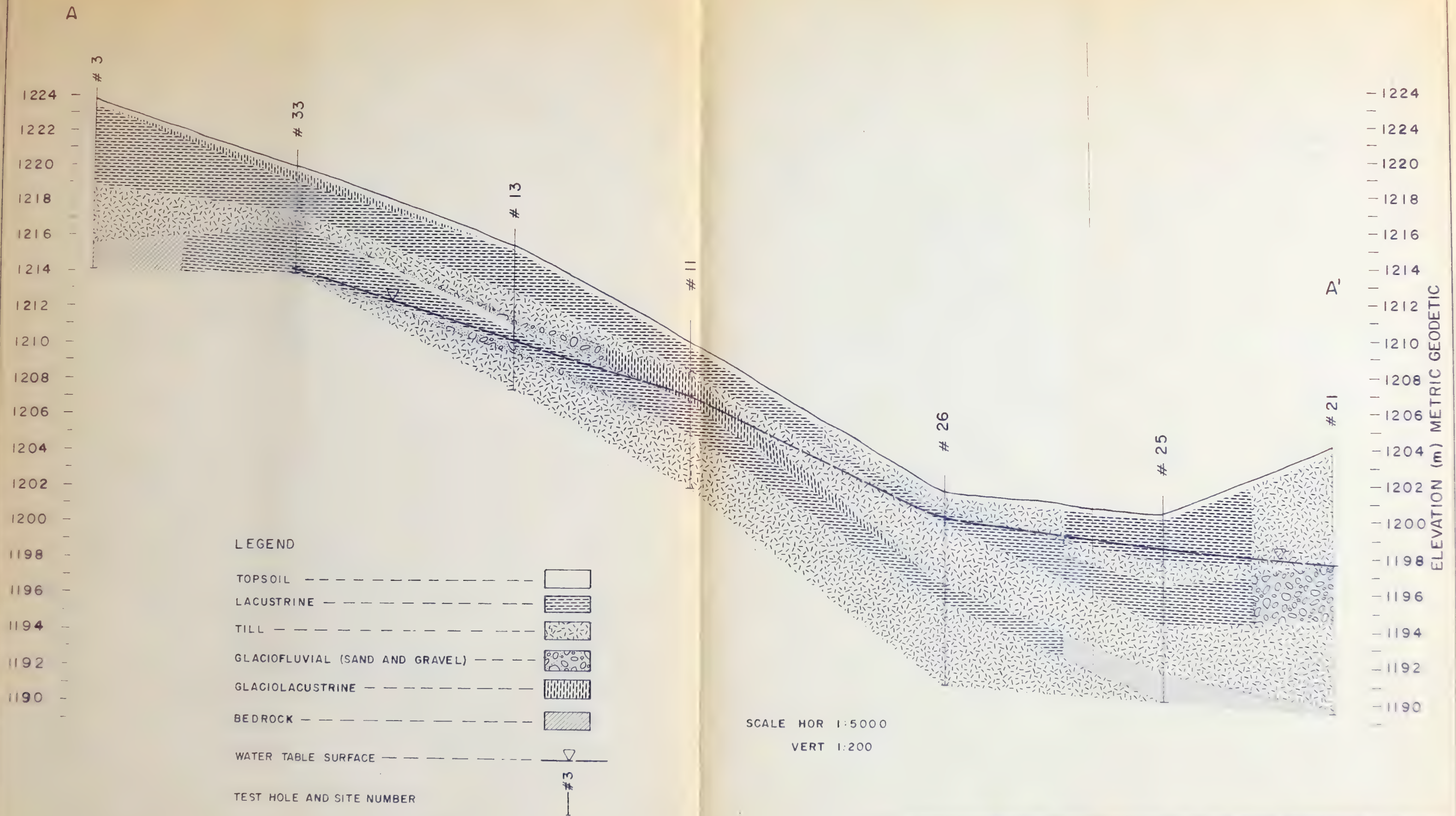
Piezometer water level data, which represent groundwater potential measurements below the water table, were used to assess vertical groundwater flow. Water table well - piezometer nest data indicate that the study area

0 10 20 40 60 80 100



- LEGEND**
- EXISTING DRAW ————>>>
 - BURIED DRAW ————>>>
 - SITE NUMBER ————● 2
 - CROSS SECTION LINE ————A A'
 - LANDFILL BOUNDARY (PHASE I) —x—x—x

		PC-CP LANDFILL MONITORING STUDY	
SITE PLAN			
SUBMITTER: <i>[Signature]</i> DATE: <i>[Signature]</i> APPROVED: <i>[Signature]</i> DATE: <i>[Signature]</i>	INVESTIGATOR: R M C CHECKED: <i>[Signature]</i> MONITOR: Y K T DATE: <i>[Signature]</i>	SCALE: 1:5000 DATE: SEPT. 1986 DRAWN BY: <i>[Signature]</i>	



Alberta ENVIRONMENT		PC-CF LANDFILL MONITORING STUDY	
SUBMITTED BY: <i>[Signature]</i> DATE: <i>[Date]</i> APPROVED: <i>[Signature]</i> DATE: <i>[Date]</i>		INVESTIGATED R. M. C. DRAWN: Y. K. T. CHECKED: <i>[Signature]</i>	
AS SHOWN SEPT. 1986		SHEET NO. 3 OF 4	

ELEVATION (m) METRIC GEODETIC

1228
1226
1224
1222
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
1198
1196
1194
1192
1190

LEGEND

- TOPSOIL ————
- LACUSTRINE ————
- TILL ————
- GLACIOFLUVIAL (SAND AND GRAVEL) ————
- GLACIOLACUSTRINE ————
- BEDROCK ————
- WATER TABLE SURFACE ————
- TEST HOLE AND SITE NUMBER ————

#2

SCALE HOR 1:5000
VERT 1:200

1228
1226
1224
1222
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
1198
1196
1194
1192
1190

B'

#19

Alberta
ENVIRONMENT

APPROVED: *[Signature]* INVESTIGATOR: M. C.
DATE: *[Date]* CHECKED: *[Signature]*
APPROVED: *[Signature]* DRAWN: Y. K. T.
DATE: *[Date]* CHECKED: *[Signature]*

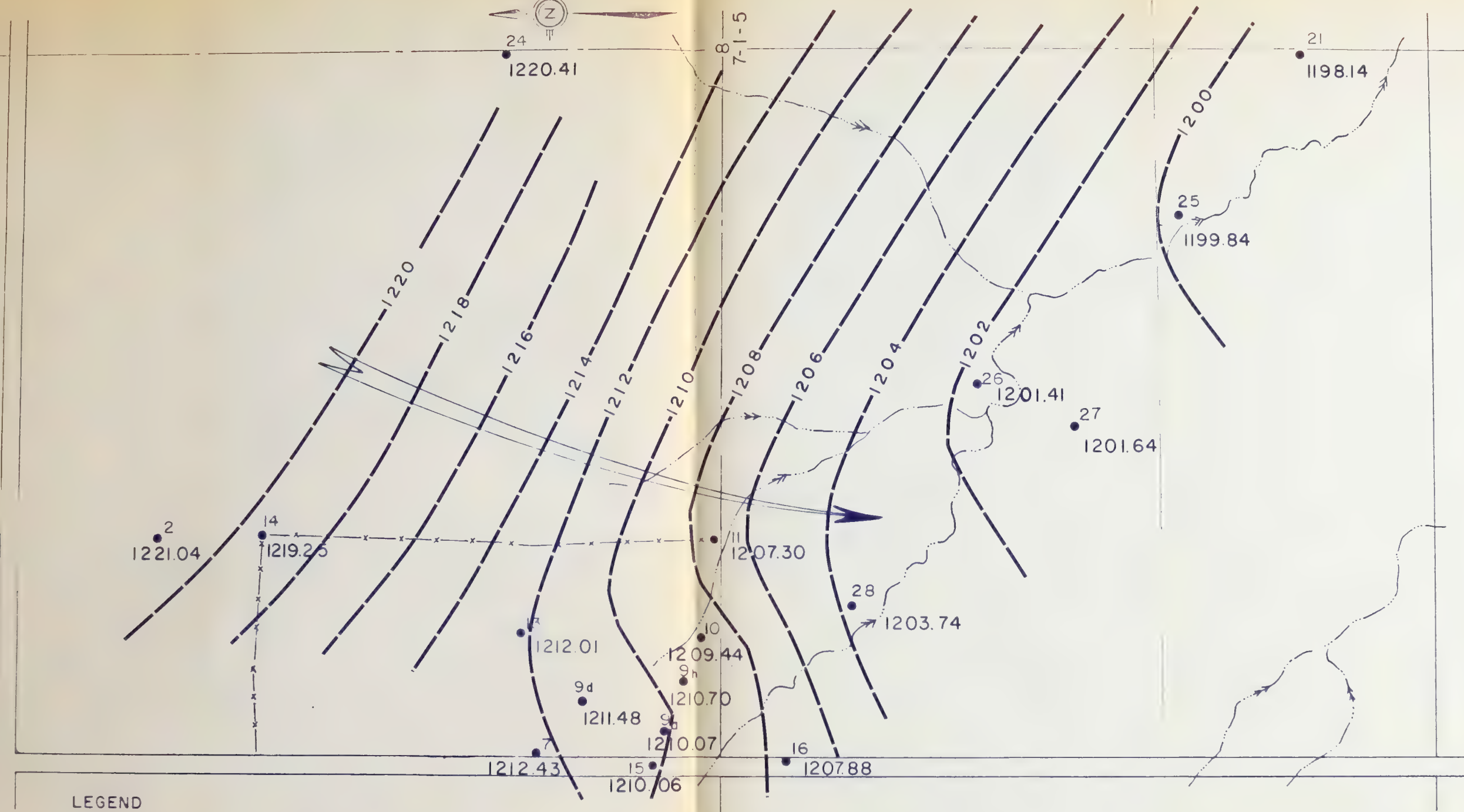
PC-CP LANDFILL MONITORING STUDY

HYDROGEOLOGIC CROSS SECTION B-B'

AS SHOWN
SEPT 1986

FIGURE No. 4
ENV M9-2-145-4

0 10 20 40 60 80 100



LEGEND

- EXISTING DRAW
- SITE NUMBER AND WATERTABLE ELEVATION (m AMSL) 1221.04
- DIRECTION OF GROUNDWATER FLOW
- GROUNDWATER ELEVATION CONTOURS 1220
- LANDFILL BOUNDARY (PHASE I)

PREPARED BY: <i>R. M. C.</i>	INVESTIGATED: R. M. C.
DATE: <i>12/10/87</i>	CHECKED:
APPROVED: <i>R. M. C.</i>	DRAWN: Y. K. TAM
DATE:	CHECKED:

RC-CF LANDFILL MONITORING STUDY	
WATERTABLE ELEVATION CONTOURS (m)	
(86/06/03)	
DATE: 1986	DATE: 1986
SEPT 1986	DATE: 1986

is subdivided into areas of discharge, recharge and lateral groundwater flow conditions. Davison (1977) attributes this pattern to the topography and complex geology of the site. The majority of the landfill parcel is characterized by lateral flow conditions.

In general, the water table is a subdued replica of the surface topography. The depth to water ranges between 2 and 3 m over the majority of the study area (Figure 6).

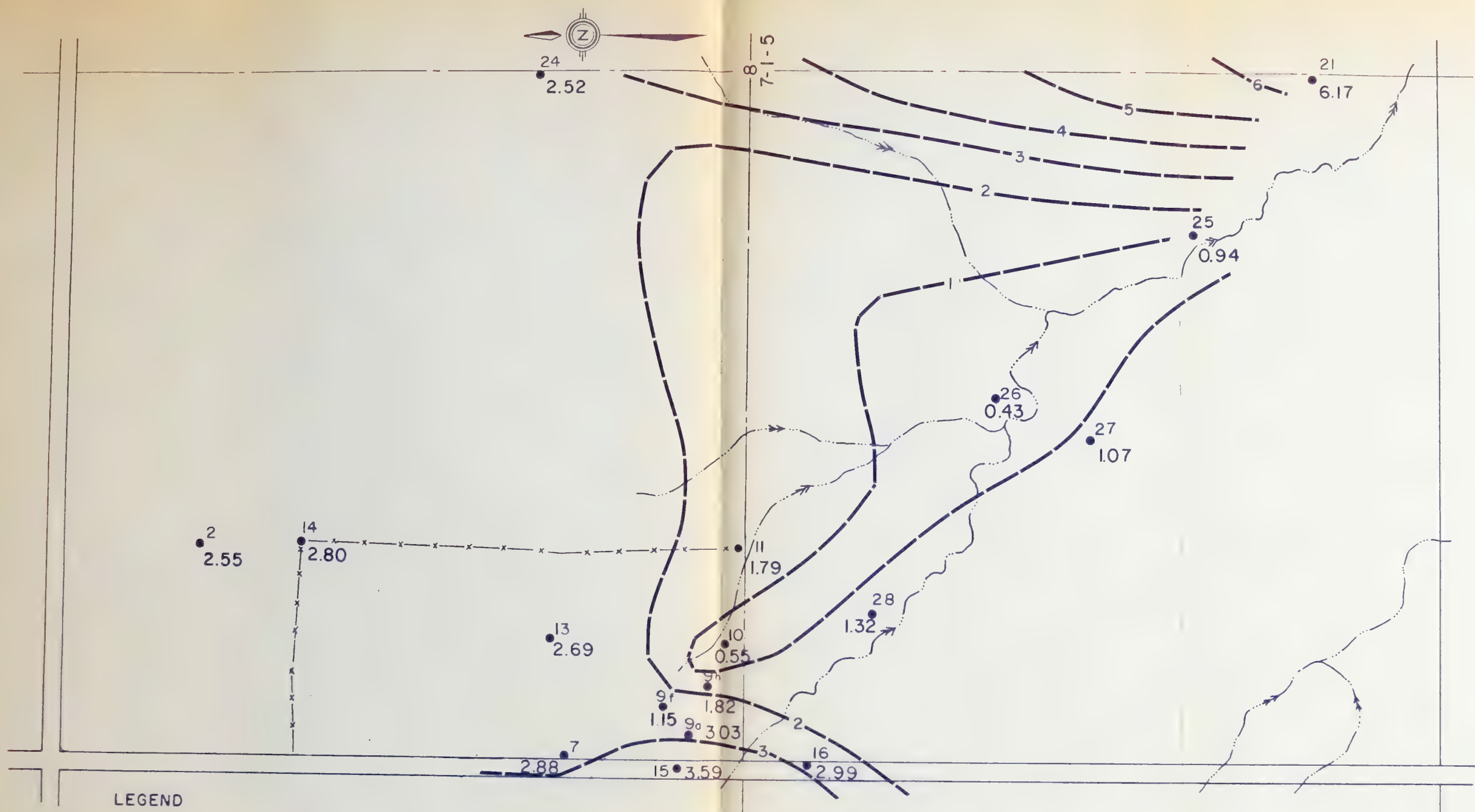
3.2 Hydraulic Conductivities

Single well response (slug) tests were conducted on various piezometers throughout the study area to obtain in-situ hydraulic conductivity values for specific geologic materials beneath the site. A summary of these results is presented in the report completed by Davison (1977). Test results indicate a hydraulic conductivity range of 10^{-5} to 10^{-8} cm/s for the glaciofluvial, lacustrine and till deposits, which constitute the bulk of the surficial materials.

3.3 Groundwater Chemistry

Selected piezometers and water table wells at the landfill have been sampled on several occasions since the landfill commenced operations. Prior to sampling, all monitors were properly developed to ensure samples were representative of formation water. Samples were collected using a peristaltic pump and filtered in the field using a 0.45 μ m filter. All sampling equipment was thoroughly cleaned between sampling events using de-ionized water. Samples were contained in polyethylene bottles and stored in a cooler for transport to the laboratory. Four samples were collected at each site: for inorganics, metals, total organic carbon (TOC) and chemical oxygen demand (COD) analysis.

Analytical data from 1982-1985 are contained in Appendix C2. Data from 1985 are graphically illustrated on the piper diagram in Figure 7 to illustrate groundwater type. Piper diagrams for 1982-84 are included in Appendix C2.



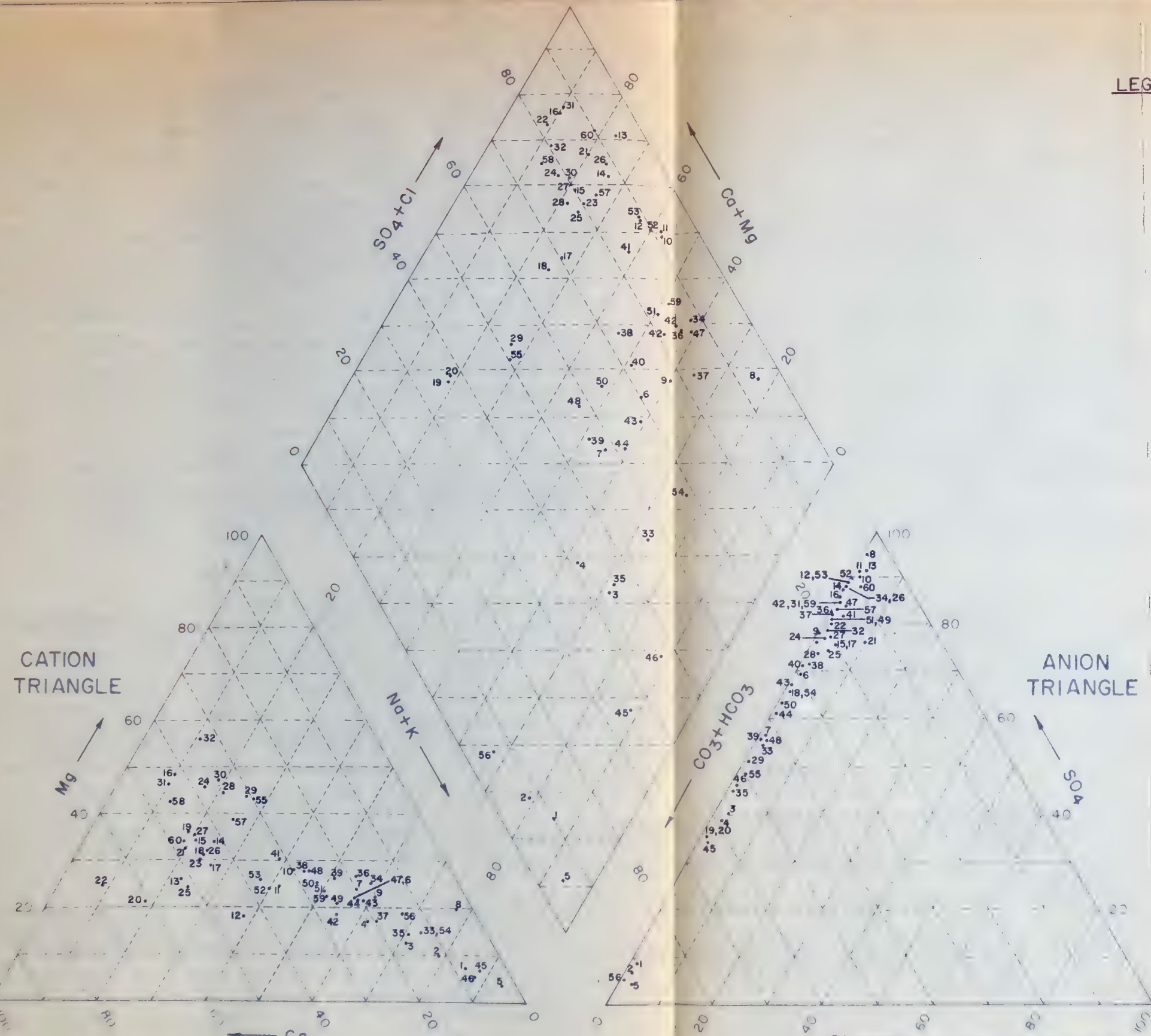
LEGEND

- EXISTING DRAW ————>———
- SITE NUMBER AND DEPTH TO GROUNDWATER TABLE 2 2.55
- DEPTH TO WATER TABLE CONTOURS —6—
- LANDFILL BOUNDARY (PHASE I) —x—x—

Alberta ENVIRONMENT		PC-CP LANDFILL MONITORING STUDY	
		DEPTH TO WATER TABLE CONTOURS(m)	
SUBMITTED <i>By [Signature]</i>	DESIGNED R. M. C.	(86/06/03)	
DATE <i>Apr 10/87</i>	CHECKED	SCALE 1:5000	
APPROVED <i>R. Chandler</i>	DRAWN Y. K. TAM	FIGURE No. 6	
DATE <i>Apr 10/87</i>	CHECKED	DATE SEPT. 1986	
		DWG M9-Z-1-E-4	

LEGEND

1 SITE No.1 PIEZ. No.1	31 SITE No.13 PIEZ. No.1
2 SITE No.1 PIEZ. No.2	32 SITE No.13a W.T.W.
3 SITE No.2 W.T.W.	33 SITE No.14 W.T.W.
4 SITE No.2 PIEZ. No.2	34 SITE No.14 PIEZ. No.1
5 SITE No.2 PIEZ. No.1	35 SITE No.14 PIEZ. No.3
6 SITE No.3 PIEZ. No.4	36 SITE No.14 PIEZ. No.2
7 SITE No.3 PIEZ. No.3	37 SITE No.20 W.T.W.
8 SITE No.3 PIEZ. No.2	38 SITE No.20 PIEZ. No.4
9 SITE No.3 PIEZ. No.1	39 SITE No.20 PIEZ. No.2
10 SITE No.5 PIEZ. No.3	40 SITE No.20 PIEZ. No.1
11 SITE No.5 PIEZ. No.2	41 SITE No.21 W.T.W.
12 SITE No.5 PIEZ. No.1	42 SITE No.25 W.T.W.
13 SITE No.7 PIEZ. No.2	43 SITE No.25 PIEZ. No.4
14 SITE No.7 PIEZ. No.1	44 SITE No.25 PIEZ. No.3
15 SITE No.8 PIEZ. No.2	45 SITE No.25 PIEZ. No.2
16 SITE No.8 PIEZ. No.1	46 SITE No.25 PIEZ. No.1
17 SITE No.9a W.T.W.	47 SITE No.26 W.T.W.
18 SITE No.9a PIEZ.	48 SITE No.26 PIEZ. No.4
19 SITE No.9b W.T.W.	49 SITE No.26 PIEZ. No.1
20 SITE No.9c W.T.W.	50 SITE No.26 PIEZ. No.3
21 SITE No.9d W.T.W.	51 SITE No.26 PIEZ. No.2
22 SITE No.9f W.T.W.	52 SITE No.27 W.T.W.
23 SITE No.9g W.T.W.	53 SITE No.27a W.T.W.
24 SITE No.10 W.T.W.	54 SITE No.27 PIEZ. No.1
25 SITE No.10 PIEZ. No.2	55 SITE No.28 W.T.W.
26 SITE No.10 PIEZ. No.1	56 SITE No.28 PIEZ. No.1
27 SITE No.10a W.T.W.	57 SITE No.29 W.T.W.
28 SITE No.11 PIEZ. No.2	58 SITE No.30 W.T.W.
29 SITE No.11 PIEZ. No.1	59 SITE No.33 W.T.W.
30 SITE No.11a W.T.W.	60 SITE No.36 W.T.W.



PERCENTAGE EQUIVALENTS PER MILLION

Alberta

INVESTIGATED R. M. C.

APPROVED R. Chandell

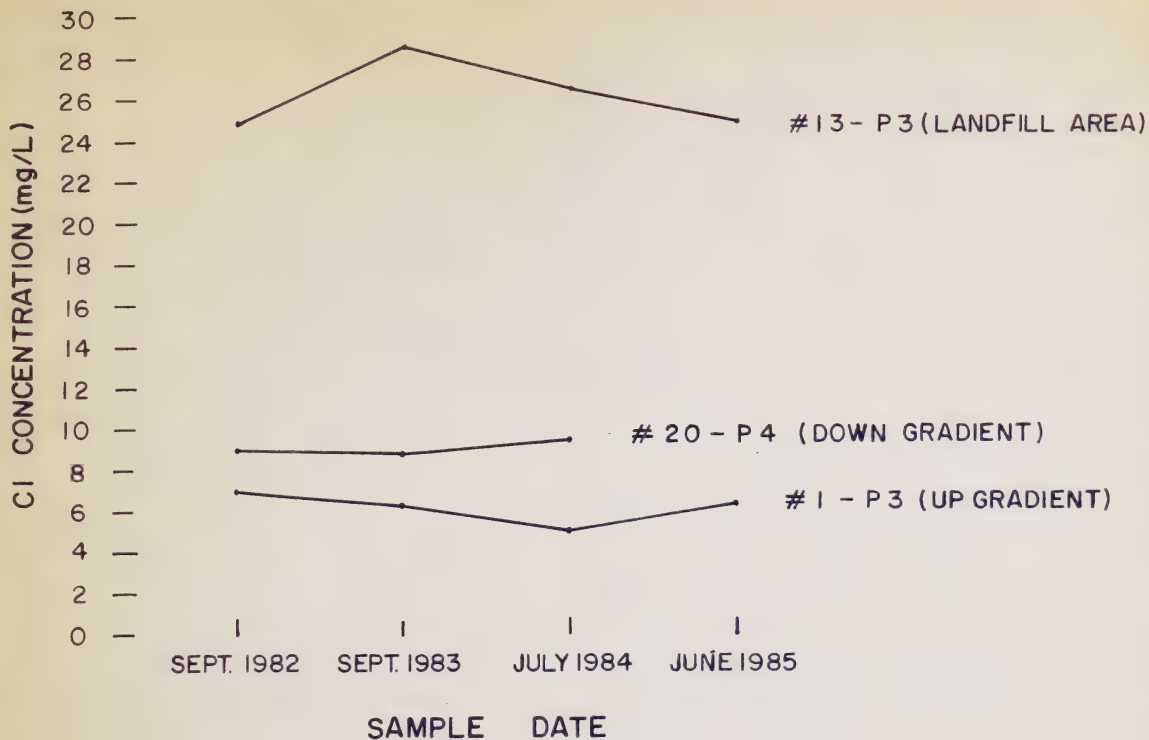
DRAWN Y. K. T.

PC-CP LANDFILL MONITORING STUDY	
PIPER PLOT OF HYDROCHEMICAL ANALYSES	
(195/00-11)	
N.A.	
SEPT. 1986	ENV. S. M2-Z-1-E

Background water quality varies from the sodium-bicarbonate to the calcium/magnesium - sulphate/chloride type, with the latter predominating. The variable groundwater chemistry reflects the heterogeneity of surficial materials. Groundwater in the recharge area (i.e. in vicinity of sites #1 and #2) tends to have a total dissolved solids (TDS) concentration in the order of 1000 mg/L. The TDS concentration increases up to 8000 mg/L along the flow path towards the landfill area. Davison (1977) also found that the TDS concentration increased with increased distance from the recharge area. This increase is concomitant with residence time. Background water is generally of poor quality, with magnesium, sulphate, iron, manganese and TDS frequently exceeding upper limits established for Canadian drinking water by Health and Welfare Canada (1978). Water quality deteriorates along the flow path from the recharge area.

The chloride concentration was used to establish the level and extent of groundwater contamination. Chloride is a good contaminant indicator because it typically has a low concentration in shallow groundwater, is relatively inert, does not readily complex and is very mobile in the aqueous environment. Elevated chloride concentrations in groundwater in the vicinity of the landfill area indicates that shallow groundwater has been contaminated. The chloride concentrations in background water is less than 5 mg/L. In the landfill area, chloride concentrations as high as 40 mg/L were detected in groundwater; however, the average concentration is 10 mg/L, far below the upper limit of 250 mg/L recommended by Health and Welfare Canada (1978). Figure 8 illustrates that the chloride concentration has varied little since 1982 in shallow groundwater up-gradient, in and down-gradient of the landfill area. The hardness, TDS, iron and manganese concentration often exceeds upper levels established for Canadian drinking water. Groundwater has a low organic load, comparable to background water.

Sulphur contaminated soil was disposed of at the landfill in 1978-79. To establish the impact of these wastes on groundwater quality, two piezometer nests (Sites #9a and b) and eight water table wells (Sites #9A to H) were completed around the sulphur disposal area. The sulphate concentration variation in groundwater from wells located around the sulphur disposal area is represented in Figure 9. Also shown in the figure are



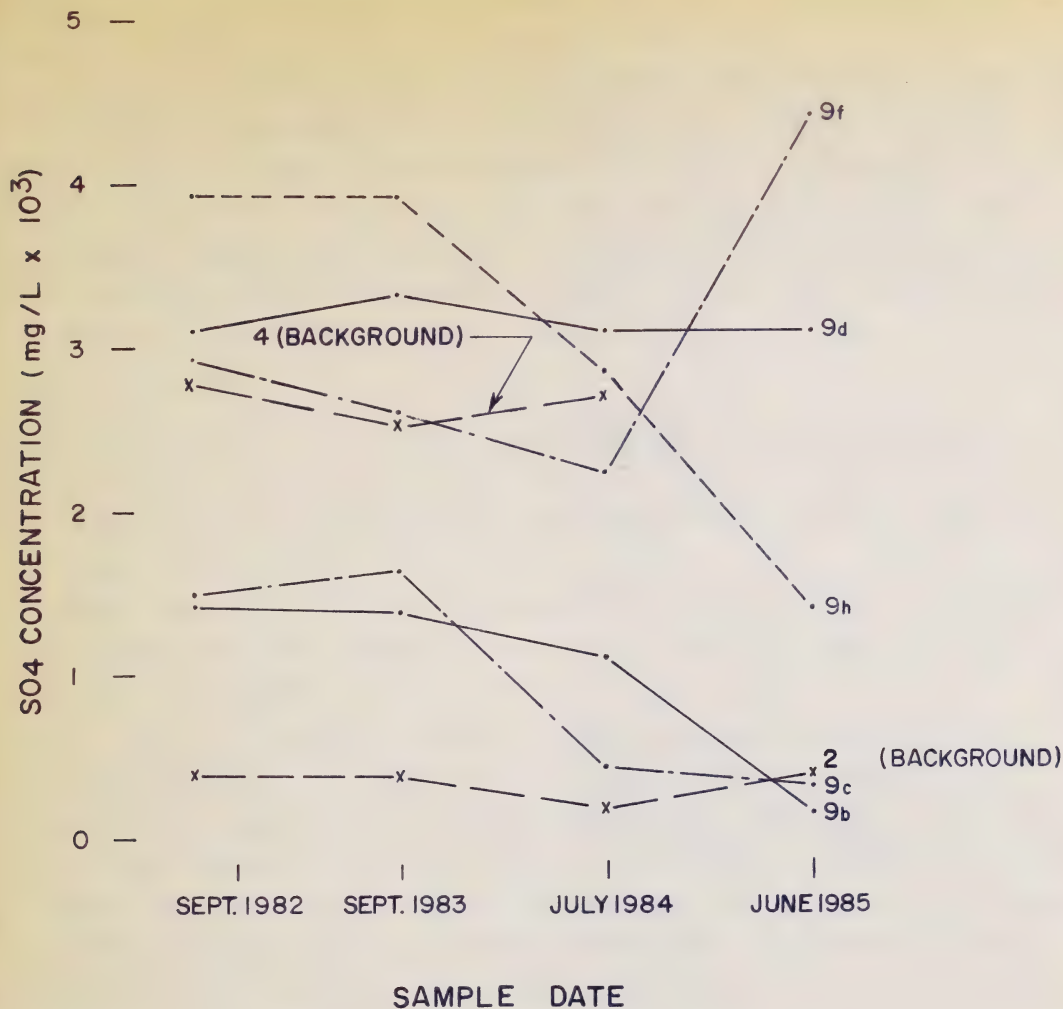
PC-CP LANDFILL MONITORING STUDY

CHLORIDE CONCENTRATION VARIATIONS

SUBMITTED *W. J. Lewis*
 DATE *Apr. 10/87*
 APPROVED *R. Shandley*
 DATE *Apr. 10/87*
 INVESTIGATED *R. M. C.*
 CHECKED
 DRAWN *Y. K. TAM*
 CHECKED *[Signature]*

SCALE AS SHOWN
 DATE OCT. 1986

FIGURE No. 8
 DWG. M9-Z-1-E-4



Alberta
ENVIRONMENT

PC-CP LANDFILL MONITORING STUDY

SULFATE CONCENTRATION VARIATIONS

PREPARED BY *W. J. [Signature]*
DATE *10/87*
APPROVED BY *R. Chandler*
DATE *April 10/87*

INVESTIGATED R. M. C.
CHECKED
DRAWN Y. K. TAM
CHECKED *[Signature]*

SCALE AS SHOWN
DATE OCT. 1986

FIGURE No. 9
DWG. M9-Z-1-E-4

sulphate concentration variations in background water from site #2 and from site #4, located immediately up-gradient from the landfill. The data indicate that sulphate concentrations in shallow groundwater from all wells, with the exception of site #9F, are either decreasing or are relatively stable. Analytical data from the piezometer/water table well nest at site #9b/#9B indicate that the sulphate concentration decreases rapidly with depth.

4.0 CONCLUSION

Relatively low permeability lacustrine materials and till, overlying the Brazeau Formation, are the predominant surficial deposits in the study area. In the landfill area a local groundwater flow system with a southerly flow overlies a regional flow system in which the principle direction of flow is toward the southeast.

Shallow groundwater chemistry is highly variable ranging from the calcium/magnesium - sulphate/chloride to the sodium - bicarbonate type. Groundwater quality tends to deteriorate from the recharge area along the flow path towards the landfill area. In background water, several parameters exceed the acceptable upper limit recommended by Health and Welfare Canada (1978). Elevated chloride concentrations in groundwater in the landfill area indicates contamination. The chloride concentration increases from less than 5 mg/L in background water to over 40 mg/L in shallow groundwater downgradient from the landfill. The level of contamination is considered low since the maximum chloride concentration is significantly less than 250 mg/L, the recommended upper limit for drinking water.

Groundwater monitoring will be continued at the site because it has regional status. However, due to the low level of contamination, the monitoring system will be reduced to include only selected wells in the immediate vicinity of the landfill area. Groundwater samples will be collected for chemical analysis once annually and water levels will be recorded quarterly. Results of future groundwater monitoring activities will be reported in annual updates.

5.0 REFERENCES

- Davison, C.C., 1977. Hydrogeology of the Pincher Creek - Crowsnest Pass Regional Landfill. W₁ 8-7-1-W5. Alberta Environment Report.
- Green, R., 1972. Geological map of Alberta. Research Council of Alberta Map 35.
- Health and Welfare Canada, 1978. Guidelines for Canadian Drinking Water Quality 1978. Canadian Government Publishing Centre. Catalogue No. H48-10/1978.
- Tokarsky, O., 1974. Hydrogeology of the Lethbridge - Fernie Area, Alberta. Alberta Research Council Report 74-1.

APPENDIX A

APPENDIX A1 GROUNDWATER PROTECTION BRANCH DRILL HOLE LOGS

A2 MONITORING WELL COMPLETION INFORMATION

A1. GROUNDWATER PROTECTION BRANCH DRILL HOLE LOGS

Location: Pincher Creek - Crowsnest Pass Regional Landfill
 Date: 1975 - 1984 Supervisor: PAG, RMC, CR, LJ, ABM, GEN
 Project: Landfill Study
 Test Hole: Site #1 to Site #36

Depth (m)	Texture and Lithology	Moisture Content*
Site #1 (5188-H)		
0.0 - 0.25	Topsoil, sandy silt	d
0.25 - 2.75	Lacustrine, silty clay	sm
2.75 - 3.00	Till, clay	sm
3.00 - 4.25	Till, silty clay	m
4.25 - 5.25	Till, sandy clay, pebbly sand partings	m
5.25 - 5.75	Till, sandy clay	vm
5.75 - 6.75	Till, sandy, saturated sand partings	sat
6.75 - 8.00	Till, sandy	vm
8.00 - 8.25	Till, clay	m
8.25 - 8.50	Sand and gravel	sm
8.50 - 9.50	Bedrock, shale	d
(1978-T)		
0.00 - 0.25	Topsoil, sandy silt	d
0.25 - 1.00	Lacustrine, silty clay	sm
1.00 - 4.75	Lacustrine, silty clay, minor pebbles and silt lamina	m

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist);
 s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
(1978-T) continued		
4.75 - 5.25	Till, sandy clay, sand partings	m
5.25 - 5.50	Till, sandy	vm
5.50 - 5.75	Till, sandy, saturated sand partings	sat
5.75 - 9.50	Till, sandy clay	m
Site #2 (1983-T)		
0.00 - 0.25	Topsoil, silty clay	d
0.25 - 1.00	Lacustrine, silty clay	sm
1.00 - 4.25	Lacustrine, silty clay	m
4.25 - 5.25	Till, sandy clay	m
5.25 - 5.75	Till, sandy, saturated sand partings	vm
5.75 - 6.75	Lacustrine, silty clay	m
6.75 - 9.75	Till, sandy clay	m
9.75 - 10.25	Till, sandy clay	sm
10.25 - 11.00	Bedrock, shale, grey	d
Site #3 (5017-H)		
0.00 - 0.25	Topsoil, sandy silt	d
0.25 - 1.00	Lacustrine, silty clay	sm
1.00 - 1.75	Lacustrine, silty clay	m
1.74 - 4.75	Lacustrine, silty clay	vm
4.75 - 5.25	Till, sandy clay	vm
5.25 - 8.00	Till, sandy clay, saturated sand partings	vm-sat
8.00 - 9.25	Bedrock, sandstone	sm

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #4 (6472-H)		
0.00 - 0.50	Topsoil, sandy silt	sm
0.50 - 1.50	Lacustrine, silty clay	m
1.50 - 3.00	Lacustrine, silty clay, varved	vm
3.00 - 4.25	Lacustrine, silty clay, varved	vm-sat
4.25 - 6.00	Till, sandy clay	m
6.00 - 6.50	Lacustrine, silty clay, varved	vm
Site #5 (1959-T)		
0.00 - 0.25	Topsoil, sandy silt, dark brown	sm
0.25 - 1.75	Lacustrine, silty clay, dark brown	m
1.75 - 3.25	Lacustrine, silty clay, brown	m
3.25 - 4.00	Till, sandy clay	m
4.00 - 4.50	Till, sandy clay, gravelly, coarse	m
4.50 - 5.25	Till, sandy sand partings	m
5.25 - 5.50	Lacustrine, sandy, gravelly	m
5.75 - 6.50	Glaciofluvial, clay sand, saturated sand partings	vm
6.50 - 8.50	Glaciofluvial, silty sand, silty clay partings	
8.50 - 10.25	Lacustrine, silty clay	m
10.25 - 12.25	Till, sandy clay	m

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #6 (1976-T)		
0.00 - 0.25	Topsoil, clay silt	m
0.25 - 2.75	Lacustrine, silty clay	m
2.75 - 3.50	Till, sandy clay	m
3.50 - 3.75	Glaciofluvial, gravel	sm
3.75 - 4.25	Till, sandy clay	m
4.25 - 5.25	Glaciofluvial, gravel	m
5.25 - 5.50	Glaciofluvial, gravel	sat
5.50 - 8.00	Till, clay sand	m
Site #7 (1972-T)		
0.00 - 0.25	Topsoil, clay silt	d
0.25 - 2.50	Lacustrine, silty clay	m
2.50 - 3.00	Glaciofluvial, gravel, clay till partings	m
3.00 - 4.25	Till, sandy clay	m
4.25 - 5.50	lacustrine, silty clay	m
5.50 - 5.75	Lacustrine, clay	m
5.75 - 6.00	Lacustrine, silty clay, silt partings	m
6.00 - 6.50	Till, sandy, sand partings	sm
6.50 - 11.00	Till, clay sand	m

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #8 (1973-T)		
0.00 - 0.25	Topsoil, clay silt	d
0.25 - 1.75	Lacustrine, silty clay	sm
1.75 - 2.50	Lacustrine, silty clay silt partings	sm
2.50 - 2.75	Glaciofluvial, gravel	sm
2.75 - 4.00	Till, sandy clay	m
4.00 - 4.50	Lacustrine, silty clay, silt partings	m
4.50 - 5.25	Lacustrine, sand and silt	vm
5.25 - 5.75	Lacustrine, sand and silt	sat
5.75 - 9.50	Till, sandy clay	sm
Site #9A (1363-T)		
0.00 - 2.50	Fill, till, lacustrine, sandy and silty clay elemental sulphur sandy topsoil	m
2.50 - 4.50	Till, sandy clay	m
4.50 - 5.00	Glaciofluvial, silty sand	vm
Site #9B (1361-T)		
0.00 - 4.25	Lacustrine, silty clay	m
4.25 - 5.00	Till, sandy clay, saturated gravel layers	sat

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #9a (1366-T)		
0.00 - 0.25	Topsoil, sand and silt	m
0.25 - 2.50	Lacustrine, silty clay	m
2.50 - 3.00	Till, sandy clay, sand partings	m
3.00 - 3.50	Till, sandy, saturated sand partings	vm
3.50 - 4.25	Till, sandy clay	m
4.25 - 5.00	Till, sandy, gravel and sand partings	vm
5.00 - 5.50	Glaciofluvial, silty sand	sat
Site #9b (1357-T)		
0.00 - 0.25	Topsoil, sandy silt	m
0.25 - 1.00	Lacustrine, silty clay, sand partings	m
1.00 - 2.75	Lacustrine, silty clay	m
2.75 - 3.00	Till, sandy clay, gravel partings	vm
3.00 - 3.75	Till, sandy, gravel partings	sat
3.75 - 4.50	Till, sandy clay	m
Site #9c (1356-T)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 2.50	Lacustrine, silty clay	n
2.50 - 2.75	Till, sandy clay	vm
2.75 - 4.50	Till, sandy clay, saturated glaciofluvial gravel layers	sat

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #9d (1360-T)		
0.00 - 0.25	Topsoil, fill, silty clay	m
0.25 - 2.50	Lacustrine, silty clay, fill material	m
2.50 - 2.75	Sulphur, elemental	vm
2.75 - 3.50	Till, sandy clay, saturated sand partings	sat
3.50 - 4.50	Till, sandy clay	m
Site #9e (1362-T)		
0.00 - 0.25	Topsoil, fill, silty clay	m
0.25 - 1.00	Lacustrine, fill, silty clay	m
1.00 - 4.00	Fill materials, lacustrine, silty clay till, sandy clay, sulphur	m
4.00 - 4.25	Till, sandy clay	m
4.25 - 5.00	Till, sandy clay, saturated glacio-fluvial gravel layers	sat
Site #9f (1358-T)		
0.00 - 0.25	Topsoil, sandy silt	m
0.25 - 2.25	Lacustrine, silty clay	m
2.25 - 2.50	Till, sandy clay, saturated sand partings	vm
2.50 - 3.75	Till, sandy clay	m
3.75 - 4.25	Glaciofluvial, silty sand	vm
4.25 - 4.50	Glaciofluvial, silty sand	sat

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #9g (1365-T)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 1.25	Lacustrine, silty clay	m
1.25 - 2.50	Lacustrine, silty clay	sm
2.50 - 4.50	Till, sandy clay	m
4.50 - 5.25	Glaciofluvial, silty sand	vm
5.25 - 5.50	Till, sandy clay	m
Site #9h (1364-T)		
0.00 - 0.25	Topsoil, sandy silt	m
0.25 - 2.25	Lacustrine, silty clay	m
2.25 - 3.50	Till, sandy clay	m
3.50 - 4.00	Bedrock, sandstone, soft weathered	vm
4.00 - 4.25	Bedrock, sandstone, soft weathered	m
Site #10 (1974-T)		
0.00 - 0.50	Topsoil, clay sand	m
0.50 - 1.50	Till, sandy clay	m
1.50 - 2.50	Lacustrine, silty clay	m
2.50 - 2.75	Till, sandy, sand and silt partings	m
2.75 - 3.00	Glaciofluvial, silty sand and gravel	m
3.00 - 4.00	Till, sandy clay	sm
4.00 - 4.50	Till, sandy clay	m
4.50 - 8.00	Till, sandy clay	sm

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #11 (1971-T)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 1.50	Lacustrine, silty clay	sm
1.50 - 1.75	Glaciofluvial, gravel	sm
1.75 - 2.75	Till, sandy clay	m
2.75 - 3.25	Glacial lacustrine, silty clay	m
3.25 - 4.50	Lacustrine, clay	m
4.50 - 4.75	Till, clay sand	m
4.75 - 5.25	Till, clay sand	sm
5.25 - 5.75	Till, clay sand, silty sand partings	sm
5.75 - 7.00	Till, clay	m
7.00 - 8.00	Till, clay	sm
Site #12 (1970-T)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 2.50	Lacustrine, silty clay, dark brown	m
2.50 - 3.25	Till, sandy clay	sm
3.25 - 4.00	Glaciofluvial, silty sand and gravel	sm
4.00 - 4.75	Till, sandy clay	sm
4.75 - 5.50	Glaciofluvial, gravel, sandy clay partings	sm
5.50 - 6.00	Glacial lacustrine, silty clay	m
6.00 - 8.00	Till, sandy clay	m

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #13 (1975-T)		
0.00 - 0.25	Topsoil, clay sand and silt	m
0.25 - 2.50	lacustrine, silty clay	sm
2.50 - 2.75	Till, sandy clay	sm
2.75 - 3.00	Till, clay sand and gravel	d
3.00 - 4.00	Till, sandy clay	m
4.00 - 4.25	Glaciofluvial, gravel	sm
4.25 - 4.50	Till, sandy clay	m
4.50 - 4.75	Till, sandy clay, saturated sand partings	m
4.75 - 5.50	Lacustrine, silty clay	m
5.50 - 5.75	Glaciofluvial, silty sand	sm
5.75 - 6.00	Glaciofluvial, gravel	sm
6.00 - 6.75	Till, sandy clay	sm
6.75 - 8.00	Till, sandy clay	m
Site #14 (6467-H)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 1.50	Lacustrine, silty clay, varved	m
1.50 - 2.50	Glacial, lacustrine, silty clay varved	m
2.50 - 5.50	Till, sandy clay	m
5.50 - 5.75	Glaciofluvial, gravel, sandy clay partings	sat
5.75 - 9.25	Till, sandy clay	m

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #15 (5019-H)		
0.00 - 0.25	Topsoil, sand and silt	sm
0.25 - 1.50	Lacustrine, silty clay	m
1.50 - 2.25	Till, sandy clay	m
2.25 - 3.00	Glacial lacustrine, silty clay sand	m
3.00 - 4.50	Till, sandy clay	m
4.50 - 5.50	Till, sandy clay	vm
5.50 - 6.00	Glaciofluvial, silty sand and gravel	sat
6.00 - 9.50	Till, sandy clay and gravel	m
Site #16 (5027-H)		
0.00 - 0.25	Topsoil, sandy silt	d
0.25 - 1.25	Lacustrine, silty clay	sm
1.25 - 5.25	Till, sandy and silty clay	m
5.25 - 15.50	Till, clay	m
(1977-T)		
0.00 - 0.25	Topsoil, sandy silt	d
0.25 - 1.25	Lacustrine, silty clay	sm
1.25 - 2.75	Till, sandy clay	m
2.75 - 3.00	Glaciofluvial, gravel, sandy clay partings	m
3.00 - 3.50	lacustrine, silty clay, silt partings	m
3.50 - 4.00	Glaciofluvial, gravel	m

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
(1977-T) continued		
4.00 - 4.25	Glaciofluvial, silty sand and gravel	m
4.25 - 5.25	Till, sandy clay	m
5.25 - 5.75	Lacustrine, silty clay	m
5.75 - 9.50	Till, clay, grey	m
Site #17 (5026-H)		
0.00 - 0.25	Topsoil, sandy silt	d
0.25 - 1.75	Lacustrine, silty clay	sm
1.75 - 6.00	Lacustrine, silty clay	m
6.00 - 8.00	Till, sandy clay	m
8.00 - 10.25	Till, sandy clay	m
(1981-T)		
0.00 - 0.25	Topsoil, sand and clay silt	sm
0.25 - 5.75	Lacustrine, silty clay, silt lamina	m
5.75 - 6.25	Glaciofluvial, gravel	d
6.25 - 7.50	Till, sandy clay	m
7.50 - 8.25	Till, clay	m
8.25 - 9.25	Till, clay	sm
9.25 - 12.50	Till, sandy clay	sm
Site #18 (1982-T)		
0.00 - 0.25	Topsoil, clay sand	sm
0.25 - 1.00	Lacustrine, silty clay, silt lamina	sm

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
(1982-T) continued		
1.00 - 6.75	Lacustrine, silty clay, silt lamina	m
6.75 - 7.25	Silty sand	d
7.25 - 11.50	Till, sandy clay	sm
11.50 - 12.50	Bedrock, siltstone	d
Site #19 (6470-H)		
0.00 - 0.50	Topsoil, sandy silt	sm
0.50 - 1.00	Lacustrine, sandy clay silt	sm
1.00 - 1.50	Lacustrine, silty clay	m
1.50 - 3.00	Lacustrine, silty clay varved	vm-sat
3.00 - 5.00	Till, sandy, gravel, sand partings	m
5.00 - 6.25	Till, sandy clay, gravel, sand partings	sm-m
6.25 - 7.50	Till, sandy clay	sm-m
7.50 - 10.25	Till, sandy clay	m
Site #20 (6469-H)		
0.00 - 0.75	Topsoil, sandy silt	sm
0.75 - 1.50	Lacustrine, silty clay	m
1.50 - 3.00	Till, silt and sandy clay	m
3.00 - 4.50	Till, silty clay	vm-sat
4.50 - 5.75	Till, sandy clay and silt	vm
5.75 - 6.25	Till, sandy clay and gravel	vm-sat
6.25 - 6.75	Till, silty clay	vm-sat
6.75 - 7.25	Till, sandy clay and gravel	vm-sat

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
(6469-H) continued		
7.25 - 7.50	Till, silty clay	vm-sat
7.50 - 9.00	Till, sandy clay	m
9.00 - 10.50	Till, sandy clay, gray	m
Site #21 (5023-H)		
0.00 - 0.25	Topsoil, silty sand	sm
0.25 - 2.00	Till, sandy clay and silt	sm
2.00 - 6.50	Till, sandy clay and silt	m
6.50 - 9.25	Glaciofluvial, gravel	sat
9.25 - 14.25	Till, sandy clay	m
14.25 - 14.50	Bedrock, shale	sm
Site #22 (6471-H)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 0.75	Lacustrine, silty clay and sand	m
0.75 - 1.50	Lacustrine, silty clay, varved	m
1.50 - 3.25	Lacustrine, silty clay and sand, varved	m-vm
3.25 - 4.75	Till, sandy clay	m
4.75 - 5.75	Till, sandy clay, saturated, sand partings	vm-sat
5.75 - 6.50	Till, sandy clay	m-vm
6.50 - 10.25	Till, sandy clay	m
10.25 - 10.50	Bedrock, shale	d

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #23 (1980-T)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 2.50	Lacustrine, silty clay	m
2.50 - 3.75	Till, sandy clay	m
3.75 - 4.00	Till, silty clay sand, saturated sand partings	sat
4.00 - 4.25	Till, silty clay sand, saturated gravel layers	sat
4.25 - 5.50	Lacustrine, silty clay	m
5.50 - 5.75	Bedrock, sandstone, grey	d
5.75 - 6.50	Bedrock, sandstone, brown	d
Site #24 (1979-T)		
0.00 - 0.25	Topsoil, clay sand and silt	d
0.25 - 1.00	Lacustrine, silty clay	sm
1.00 - 2.75	Till, sandy clay	m
2.75 - 3.00	Till, sandy clay, saturated sand partings	vm
3.00 - 3.25	glacial lacustrine, silty clay	m
3.25 - 4.00	Till, clay sand and silt	sm
4.00 - 4.50	Bedrock, shale, hard	sm
4.50 - 5.50	Bedrock, sandstone, hard	d
5.50 - 6.25	Bedrock, shale, hard	d
6.25 - 6.50	Bedrock, shale	sat

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #25 (6458-H)		
0.00 - 0.25	Topsoil, sand and clay silt	sm
0.25 - 0.75	Lacustrine, sand clay and silt	m
0.75 - 1.50	Lacustrine, silty clay	m
1.50 - 2.50	Lacustrine, silty clay	vm
2.50 - 3.75	Till, silty clay and gravel	sat
3.75 - 4.50	Lacustrine, silty clay, varved	sat
4.50 - 6.00	Lacustrine, sand and clay silt, varved	vm
6.00 - 7.50	Till, silt and sandy clay	m
7.50 - 8.75	Till, sandy clay	m
8.75 - 10.25	Bedrock, sand shale	sm
Site #26 (134-T)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 1.00	Till, sandy clay and silt	m-vm
1.00 - 1.50	Lacustrine, sandy clay silt, varved	vm-sat
1.50 - 4.00	Till, silty clay sand	vm-sat
4.00 - 5.00	Till, sandy clay, gravel	sat
5.00 - 6.00	Lacustrine, silty clay, varved	sat
6.00 - 7.50	Till, sandy clay and silt	m-vm
7.50 - 10.50	Till, sandy clay	m

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #27 (5031-T)		
0.00 - 0.25	Topsoil, silty sand	sm
0.25 - 1.75	Till, sandy clay and silt	m
1.75 - 4.25	Till, silty clay	m
4.25 - 4.50	Glaciofluvial, sand	sat
4.50 - 10.00	Till, silty clay	vm
10.00 - 12.25	Till, clay, blue	m
12.25 - 14.00	Till, clay, grey	m
Site #28 (5194-H)		
0.00 - 0.25	Topsoil, sandy silt	d
0.25 - 0.50	Lacustrine, silty clay	sm
0.50 - 2.25	Lacustrine, silty clay	m
2.25 - 4.50	Till, sandy clay and silt	m
4.50 - 4.75	Glaciofluvial, sand and gravel	sat
4.75 - 7.00	Till, sandy clay and silt	vm
7.00 - 7.50	Till, sandy clay and silt, grey blue	m
7.50 - 9.50	Till, sandy clay, grey blue	sm-m
(6473-H)		
0.00 - 0.25	Topsoil, sandy silt	sm
0.25 - 1.25	Lacustrine, silty clay sand	m
1.25 - 2.75	Till, sandy clay and silt	m
2.75 - 3.25	Lacustrine, silty clay	sat

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
(6473-H) continued		
3.25 - 3.75	Till, sandy clay and silt	m-vm
3.75 - 5.75	Till, sandy clay, gravel, light blue grey	m
Site #29 (2152-T)		
0.00 - 0.75	Till, clay	m
0.75 - 3.25	Till, clay	m
3.25 - 5.25	Lacustrine, silty clay	m
5.25 - 6.00	Till, sandy clay	m
(6595-H)		
0.00 - 1.25	Glacial lacustrine, clay	m
1.25 - 1.75	Lacustrine, silty clay, silt and sand partings	vm
1.75 - 2.25	Till, sandy clay	m
2.25 - 2.75	Glaciofluvial, clay gravel	m
2.75 - 3.25	Till, sandy clay and gravel	m
3.25 - 3.75	Lacustrine, silty clay, saturated sand and silty partings	vm-sat
3.75 - 5.00	Lacustrine, silty clay	vm
5.00 - 5.75	Lacustrine, sand and silt	m
Site #30 (2153-T)		
0.00 - 1.75	Fill, clay	m
1.75 - 2.25	Lacustrine, silty clay	m
2.25 - 3.00	Till, clay	m

* Moisture Content: d(dry); sm(very slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
(2153-T) continued		
3.00 - 3.50	Till, sandy clay and gravel	sm
3.50 - 3.75	Lacustrine, silty clay	m
3.75 - 5.25	Till, clay	m
5.25 - 6.00	Till, sandy clay	m
Site #31 (1984-T)		
0.00 - 1.25	Fill, silty clay	m
1.25 - 4.75	Refuse, waste, garbage, etc, clay layers	vm
4.75 - 5.75	Lacustrine, silty clay	m
Site #32 (1985-T)		
0.00 - 1.25	Fill, silty clay	m
1.25 - 5.50	Refuse, garbage, waste, etc	vm
5.50 - 5.75	Lacustrine, silty clay	m
Site #33 (6596-H)		
0.00 - 0.25	Topsoil, sandy silt	m
0.25 - 0.75	Glacial lacustrine, silt and sandy clay	m
0.75 - 2.50	Lacustrine, silty clay, sand and silty partings	m
2.50 - 3.25	Till, clay	m
3.25 - 6.00	Lacustrine, clay, silt partings	m

* Moisture Content: d(dry); sm(slightly moist); m(moist); vm(very moist); s(saturated).

Depth (m)	Texture and Lithology	Moisture Content*
Site #34 (129-T)		
0.00 - 0.25	Topsoil, clay sand	sm
0.25 - 5.25	Till, clay	sm
5.25 - 6.00	Till, sandy clay and silt, saturated sand layers	vm
6.00 - 6.50	Bedrock, shale	d
Site #35 (5022-H)		
0.00 - 0.25	Topsoil, silty sand	sm
0.25 - 1.75	Glacial lacustrine, silt and sandy clay	m
1.75 - 6.50	Till, silt and sandy clay	m
6.50 - 9.50	Till, silt and sandy clay	vm
9.50 - 12.50	Till, clay	m
12.50 - 13.50	Bedrock, shale	d-sm
Site #36 (7357-H)		
0.00 - 0.25	Topsoil, sandy silt, brown	m
0.25 - 1.25	Lacustrine, silty clay, silt partings, dark brown	d-sm
1.25 - 1.50	Glacial lacustrine, clay, brown	sm-m
1.50 - 2.00	Till, clay, gravel partings, brown	sm-m
2.00 - 2.50	Till, clay	sm-m
2.50 - 3.25	Lacustrine, silty clay, dark brown	m
3.25 - 4.00	Till, sandy, gravel layers, brown	m-vm
4.00 - 6.25	Till, sandy, saturated sand partings, brown	vm

* Moisture Content: d(dry); sm(very moist); m(moist); vm(very moist);
s(saturated).

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe Above Ground Surface (m)	Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
Site #4 (6472-H)	WTW	1980-11-18	6.49	0.51	1.50 - 6.49	1220.76	1221.27
Site #5 (1969-T)	Piez#1	1980-07-08	11.49	0.63	10.99 - 11.49	1219.90	1220.53
	Piez#2	1980-07-08	7.78	0.55	7.28 - 7.78	1219.90	1220.45
	Piez#3	1980-07-08	5.78	0.59	5.28 - 5.78	1219.90	1220.49
	WTW	1980-07-08	4.61	0.55	1.00 - 4.61	1219.87	1220.42
Site #6 (1976-T)	Piez#1	1980-07-09	7.77	0.03	7.27 - 7.77	1216.92	1216.95
	Piez#2	1980-07-09	5.64	0.12	5.14 - 5.64	1216.92	1217.04
	WTW	1980-07-09	3.37	0.06	1.00 - 3.37	1216.92	1216.86
Site #7 (1972-T)	Piez#1	1980-07-08	10.70	0.60	10.20 - 10.70	1215.30	1215.90
	Piez#2	1980-07-08	6.18	0.42	5.68 - 6.18	1215.30	1215.72
	WTW	1980-07-08	4.31	0.69	1.00 - 4.31	1215.31	1216.00
Site #8 (1973-T)	Piez#1	1980-07-08	9.56	0.73	9.06 - 9.56	1213.31	1214.04
	Piez#2	1980-07-08	5.77	0.95	5.27 - 5.77	1213.31	1214.26
	WTW	1980-07-08	2.78	0.86	1.00 - 2.78	1213.24	1214.10

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe Above Ground Surface (m)	Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
Site #9A (1363-T)	Piez#1	1979-07-03	5.01	0.32	4.51 - 5.01	1212.88	1213.20
Site #9B (1361-T)	Piez#1	1979-07-03	4.96	0.22	4.46 - 4.96	1213.69	1213.91
Site #9a (1366-T)	WTW	1979-07-03	5.39	0.40	1.00 - 5.39	1213.15	1213.55
Site #9b (1357-T)	WTW	1979-07-03	4.51	0.29	1.00 - 4.51	1213.01	1213.30
Site #9c (1356-T)	WTW	1979-07-03	4.42	0.49	1.00 - 4.42	1214.49	1214.98
Site #9d (1360-T)	WTW	1979-07-03	4.48	0.37	1.00 - 4.48	1214.31	1214.68
Site #9e (1362-T)	WTW	1979-07-03	5.00	0.30	1.00 - 5.00	1214.08	1214.38
Site #9f (1358-T)	WTW	1979-07-03	4.48	0.07	1.00 - 4.48	1212.52	1212.59
Site #9g (1365-T)	WTW	1979-07-03	5.57	0.45	1.00 - 5.57	1212.52	1212.97
Site #9h (1364-T)	WTW	1979-07-03	4.06	0.48	1.00 - 4.06	1211.92	1212.40
Site #10 (1974-T)	Piez#1	1980-07-10	5.45	0.75	4.95 - 5.45	1210.03	1210.78
	Piez#2	1980-07-10	3.53	0.67	3.03 - 3.53	1210.03	1210.70
	WTW	1980-07-10	2.23	0.67	1.00 - 2.23	1209.99	1210.66
#10a	Galv. WTW	1980-07-10	5.14	0.48	0.50 - 5.14	1210.32	1210.80

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe Above Ground Surface (m)	Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
Site #11 (1971-T)	Piez#1	1980-07-08	8.23	0.71	7.73 - 8.23	1209.92	1210.63
	Piez#2	1980-07-08	6.24	0.90	5.74 - 6.24	1209.92	1210.83
	WTW	1980-07-08	2.70	0.78	1.00 - 2.70	1210.06	1210.84
Site #12 (1970-T)	Galv. WTW	1980-07-08	5.77	0.33	0.50 - 5.77	1209.09	1209.42
	Piez#1	1980-07-08	8.10	0.83	7.60 - 8.10	1216.58	1217.41
	Piez#2	1980-07-08	5.73	0.70	5.23 - 5.73	1216.58	1217.28
Site #13 (1975-T)	Piez#3	1980-07-08	4.69	0.77	4.19 - 4.69	1216.58	1217.35
	Piez#1	1980-07-09	8.36	0.68	7.86 - 8.36	1215.45	1216.13
	Piez#2	1980-07-09	6.65	0.45	6.15 - 6.65	1215.45	1215.90
#13a	Piez#3	1980-07-09	5.38	0.65	4.88 - 5.38	1215.45	1216.10
	WTW	1980-07-09	4.57	0.71	1.00 - 4.57	1215.47	1216.18
	Galv WTW	1980-07-09	5.84	0.23	0.50 - 5.84	1215.09	1215.32

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe		Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
				Above Ground Surface (m)				
Site #14 (6467-H)	Piez#1	1981-01-	9.47	0.59		8.97 - 9.47	1222.07	1222.66
	Piez#2	1981-01-	9.23	0.47		8.73 - 9.23	1222.07	1222.54
	Piez#3	1981-01-	6.25	0.46		5.76 - 6.26	1222.07	1222.53
	Piez#4	1981-01-	5.76	0.64		5.26 - 5.76	1222.07	1222.71
Site #15 (5019-H)	WTW	1981-01-	5.03	0.20		1.00 - 5.03	1222.05	1222.25
	Piez#1	1975-05-	8.97	0.48		8.52 - 8.97	1213.65	1214.13
	WTW	1975-05-	8.74	0.40		1.50 - 8.74	1213.65	1214.05
	Piez#1	1980-07-09	9.90	0.64		9.40 - 9.90	1210.89	1211.53
Site #16 (1977-T)	Piez#2	1980-07-09	5.20	0.64		4.70 - 5.20	1210.89	1211.53
	WTW	1975-05-29	14.85	0.09		6.10 - 14.85	1211.03	1211.12
	WTW	1980-07-09	3.32	0.63		1.00 - 3.32	1210.87	1211.50
	Piez#1	1980-07-09	11.93	0.88		11.43 - 11.93	1206.57	1207.45
Site #17 (5026-H)	WTW	1975-05-29	8.20	0.66		1.00 - 8.20	1206.57	1207.23
	Piez#1	1980-07-09	12.27	0.50		11.77 - 12.27	1203.76	1204.26

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe Above Ground Surface (m)	Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
Site #19 (6470-H)	Piez#1	1981-01-	10.39	0.56	9.89 - 10.39	1198.88	1199.44
	Piez#2	1981-01-	6.76	0.57	6.26 - 6.76	1198.88	1199.45
	Piez#3	1981-01-	2.87	0.71	2.37 - 2.87	1198.88	1199.59
	WTW	1981-01-	1.41	0.59	1.00 - 1.41	1199.08	1199.64
Site #20 (6469-H)	Piez#1	1981-01-	8.93	0.52	8.43 - 8.93	1196.94	1197.46
	Piez#2	1981-01-	7.39	0.56	6.89 - 7.39	1196.94	1197.50
	Piez#3	1981-01-	5.85	0.63	5.35 - 5.85	1196.94	1197.57
	Piez#4	1981-01-	4.49	0.59	3.99 - 4.49	1196.94	1197.53
Site #21 (5023-H)	WTW	1981-01-	4.02	0.48	1.00 - 4.02	1196.96	1197.44
	Piez#1	1975-05-	6.45	0.23	6.00 - 6.45	1204.32	1204.55
	Piez#2	1975-05-	4.51	0.33	4.06 - 4.51	1204.32	1204.65
	WTW	1975-05-	7.53	0.26	1.00 - 7.53	1204.31	1204.57

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe		Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
				Above Ground Surface (m)	Below Ground Surface (m)			
Site #22 (6471-H)	Piez#1	1981-01-	11.43	0.57	10.93 - 11.43	1207.75	1208.32	
	Piez#2	1981-01-	10.23	0.43	9.73 - 10.23	1207.75	1208.18	
	Piez#3	1981-01-	6.80	0.01	6.30 - 6.80	1207.75	1207.76	
	Piez#4	1981-01-	5.52	0.50	5.02 - 5.52	1207.75	1208.25	
	Piez#5	1981-01-	2.93	0.66	2.43 - 2.93	1207.75	1208.41	
Site #23 (1980-T)	Piez#1	1980-07-10	5.78	0.82	5.28 - 5.78	1214.34	1215.16	
	Piez#2	1980-07-10	5.12	0.68	4.62 - 5.12	1214.34	1215.02	
	WTW	1980-07-10	4.16	0.75	1.00 - 4.16	1214.28	1215.03	
	Piez#1	1980-07-09	6.11	0.59	5.61 - 6.11	1223.05	1223.64	
Site #24 (1979-T)	Piez#2	1980-07-09	4.40	0.60	3.90 - 4.40	1223.05	1223.65	
	WTW	1980-07-09	3.38	0.62	1.00 - 3.38	1222.93	1223.55	
	Piez#1	1981-01-	10.28	0.39	9.78 - 10.28	1200.84	1201.23	
Site #25 (6478-H)	Piez#2	1981-01-	8.94	0.48	8.44 - 8.94	1200.84	1201.23	
	Piez#3	1981-01-	4.59	0.49	4.09 - 4.59	1200.84	1201.23	
	Piez#4	1981-01-	4.00	0.39	3.50 - 4.00	1200.84	1201.23	
	WTW	1981-01-	2.71	0.28	1.00 - 2.71	1200.78	1201.06	

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe Above Ground Surface (m)	Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
Site #26 (134-T)	Piez#1	1980-11-18	10.67	0.62	10.17 - 10.67	1201.90	1202.55
	Piez#2	1980-11-18	9.26	0.73	8.76 - 9.26	1201.90	1202.65
	Piez#3	1980-11-18	6.30	0.11	5.80 - 6.30	1201.90	1202.01
	Piez#4	1980-11-18	5.48	0.48	4.98 - 5.48	1201.90	1202.42
Site #27 (5031-H)	WTW	1980-11-18	3.74	0.42	1.00 - 3.74	1201.90	1202.22
	Piez#1	1975-05-	11.92	0.33	11.47 - 11.92	1202.68	1203.01
	WTW	1981-07-09	4.35	0.30	1.00 - 4.35	1202.71	1203.01
	WTW	1975-05-	10.78	0.19	1.00 - 10.78	1202.73	1202.92
Site #28 (5194-H)	Piez#1	1976-06-08	8.46	0.54	8.01 - 8.46	1206.12	1206.69
	Piez#2	1976-06-08	3.32	0.67	2.87 - 3.32	1206.12	1206.15
	Piez#3	1976-06-08	1.46	0.58	1.01 - 1.46	1206.12	1206.70
	WTW	1981-01-	5.44	0.76	1.00 - 5.44	1205.05	1205.81
Site #29 (2152-T) (6595-H)	Galv. WTW	1981-01-	5.72	0.38	1.00 - 5.72	1215.77	1216.15

APPENDIX A2. MONITORING WELL COMPLETION INFORMATION continued

Observation Well # (Test Hole Ref.)	Type of Observation Well	Date Installed	Observation Well Depth (m)	Height of Pipe Above Ground Surface (m)	Screened Interval (m)	Ground Elevation (m)	Elevation Top of Pipe
Site #30 (2153-T)	Galv. WTW	1981-01-	5.71	0.39	1.00 -	1215.46	1215.85
#31 (1984-T)	CH ₄ Gas Well	1981-07-10	5.76	0.34	1.50 -	1219.02	1219.36
#32 (1985-T)	CH ₄ Gas Well	1980-07-10	5.57	0.53	1.50 -	1221.54	1222.07
#33 (6596-H)	WTW	1981-01-	6.06	0.28	1.00 -	1219.85	1220.13
#34 (129-T)	Piez#1	1976-09-	5.86	0.55	5.41 -	1231.83	1232.10
#35 (5022-H)	Piez#2	1975-06-	12.15	0.45	11.70 -	1211.85	1212.30
	Piez#3	1975-06-	5.49	0.56	5.04 -	1211.85	1212.41
#36 (7357-H)	WTW	1984-10-22	5.76	0.74	1.50 -	1210.68	1211.42

APPENDIX B
WATER LEVEL DATA

APPENDIX B. WATER LEVEL DATA

Well Number	Type/Depth (m)	Monitor Ground Elev. (m)	1985-05-15		1985-08-08		1986-01-29		1986-03-13		1986-06-03	
			Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Site #1	Piez#1/9.61	1228.07	5.89	1222.18	6.00	1222.07	5.88	1222.19	5.82	1222.25	5.95	1222.12
	Piez#2/8.57	1228.07	5.93	1222.14	6.05	1222.02	5.93	1222.14	5.87	1222.20	5.99	1222.08
	Piez#3/6.92	1228.07	6.22	1221.85	5.35	1222.72	6.31	1221.76	6.25	1222.82	6.22	1221.85
	Piez#4/4.85	1228.07	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
Site #2	Piez#1/10.59	1223.52	5.64	1216.47	8.24	1215.28	5.83	1217.69	5.54	1217.98	5.01	1218.51
	Piez#2/5.83	1223.52	2.48	1221.04	2.48	1221.04	2.40	1221.12	2.45	1221.07	2.58	1220.94
	WTW /4.58	1223.59	2.53	1221.06	2.53	1221.06	2.43	1221.16	--	--	2.55	1221.04
	Piez#1/10.91	1223.61	0.25	1223.36	2.14	1221.47	0.39	1223.22	Frozen	--	0.36	1223.25
Site #3	Piez#2/8.28	1223.61	0.23	1223.38	0.49	1223.12	Frozen	--	Frozen	--	0.42	1223.19
	Piez#3/7.76	1223.61	0.82	1222.79	2.77	1220.84	0.36	1223.25	Frozen	--	0.05	1223.56
	Piez#4/5.89	1223.61	-0.15	1223.76	-0.15	1223.76	Frozen	--	-0.12	1223.73	-0.12	-1223.73
	WTW /4.36	1223.63	Mud @ 0.83	--	Mud	--	0.40	1223.23	0.53	1223.10	Mud	--
Site #4	WTW /6.49	1220.76	--	--	--	--	--	--	--	--	--	--
Site #5	Piez#1/11.49	1219.90	6.00	1213.90	6.07	1213.83	6.01	1213.89	5.94	1213.96	5.91	1213.99
	Piez#2/7.78	1219.90	5.29	1214.61	5.25	1214.65	5.15	1214.75	5.09	1214.81	5.07	1214.83
	Piez#3/5.78	1219.90	5.28	1214.62	5.29	1214.61	5.19	1214.71	5.11	1214.79	5.11	1214.79
	WTW /4.61	1219.87	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
Site #6	Piez#1/7.77	1216.92	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
	Piez#2/5.64	1216.92	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
	WTW /3.37	1216.92	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--

APPENDIX B. WATER LEVEL DATA continued

Well Number	Type/Depth (m)	Monitor Ground Elev. (m)	1985-05-15		1985-08-08		1986-01-29		1986-03-13		1986-06-03	
			Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Site #7	Piez#1/10.70	1215.30	4.56	1210.74	5.38	1209.92	4.35	1210.95	4.05	1211.25	3.30	1212.00
	Piez#2/6.18	1215.30	4.82	1210.48	4.60	1210.70	4.38	1210.92	3.38	1211.92	3.17	1212.13
	WTW /4.31	1215.31	3.55	1211.76	Dry	--	3.17	1212.14	2.98	1212.33	2.88	1212.43
Site #8	Piez#1/9.56	1213.31	4.31	1209.00	4.34	1208.97	3.52	1209.79	2.97	1210.34	3.17	1210.14
	Piez#2/5.77	1213.31	3.81	1209.50	4.41	1208.90	3.46	1209.85	2.92	1210.39	3.27	1210.04
	WTW /2.78	1213.24	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
Site #9	Piez"A"/5.01	1212.88	3.17	1209.71	3.42	1209.46	2.48	1210.40	2.01	1210.87	2.25	1210.63
	Piez"B"/4.96	1213.69	2.57	1210.80	3.78	1209.91	2.60	1211.09	2.11	1211.58	1.69	1212.00
	WTW "a"/5.39	1213.15	4.84	1209.19	4.22	1208.93	3.30	1209.85	2.77	1210.38	3.03	1210.07
	WTW "b"/4.51	1213.01	2.83	1210.18	3.23	1209.78	2.03	1210.98	1.06	1211.95	1.82	1211.19
	WTW "c"/4.42	1214.49	2.88	1211.61	3.42	1211.07	1.76	1212.73	1.28	1213.21	2.24	1212.25
	WTW "d"/4.48	1214.31	3.30	1211.01	3.14	1211.17	3.01	1211.30	2.96	1211.35	2.83	1211.48
	WTW "e"/5.00	1214.08	--	--	--	--	--	--	--	--	--	--
	WTW "f"/4.48	1212.52	3.03	1209.49	2.91	1209.61	2.15	1210.37	1.61	1210.91	1.15	1211.37
	WTW "g"/5.57	1212.52	3.42	1209.10	3.28	1209.24	2.90	1209.62	2.40	1210.12	1.82	1210.70
Site #10	WTW "h"/4.06	1211.92	--	--	--	--	--	--	--	--	--	--
	Piez#1/5.45	1210.03	3.38	1206.65	5.81	1204.22	Frozen	--	-0.05	1210.08	0.52	1209.51
	Piez#2/3.53	1210.03	0.86	1209.17	1.48	1208.55	0.10	1209.93	0.12	1209.91	0.56	1209.47
	WTW /2.23	1209.99	0.79	1209.20	1.42	1208.57	Frozen	--	0.03	1209.96	0.55	1209.44
	WTW"a"/5.14	1210.32	0.96	1209.36	1.47	1208.85	0.13	1210.19	0.07	1210.25	0.57	1209.75

APPENDIX B. WATER LEVEL DATA continued

Well Number	Type/Depth (m)	1985-05-15		1985-08-08		1986-01-29		1986-03-13		1986-06-03		
		Monitor Ground Elev.(m)	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Site #11	Piez#1/8.23	1209.92	4.08	1205.86	5.15	1204.77	3.33	1206.59	2.34	1207.58	2.77	1207.17
	Piez#2/6.24	1209.92	3.54	1206.39	3.76	1206.17	2.67	1207.26	2.64	1207.27	2.78	1207.15
	WTW /2.70	1210.06	Dry	--	Dry	--	2.25	1207.81	2.27	1207.79	Dry	--
	WTW#a"/5.77	1209.09	2.51	1206.58	2.90	1206.19	1.60	1207.49	1.72	1207.37	1.79	1207.30
Site #12	Piez#1/8.10	1216.58	7.40	1209.18	7.42	1209.16	7.38	1209.20	7.37	1209.21	7.34	1209.24
	Piez#2/5.73	1216.58	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
	Piez#3/4.69	1216.58	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
Site #13	Piez#1/8.36	1215.45	5.12	1210.33	5.04	1210.41	4.62	1210.83	4.52	1210.93	4.35	1211.10
	Piez#2/6.65	1215.45	5.47	1209.98	5.27	1210.18	4.91	1210.54	4.85	1210.60	4.63	1210.82
	Piez#3/5.38	1215.45	Dry	--	Dry	--	Dry	--	Dry	--	3.71	1211.74
	WTW /4.57	1215.47	Dry	--	Dry	--	3.77	1211.70	1.19	1214.28	3.46	1212.01
Site #14	WTW#a"/5.84	1215.09	3.56	1211.53	3.52	1211.57	2.94	1212.15	2.66	1212.43	2.69	1212.40
	Piez#1/9.47	1222.07	5.57	1216.50	7.61	1214.66	5.88	1216.19	5.59	1216.48	5.13	1216.94
	Piez#2/9.23	1222.07	3.87	1218.20	4.13	1217.94	3.93	1218.14	3.88	1218.19	3.98	1218.09
	Piez#3/6.25	1222.07	3.56	1218.51	3.60	1218.47	3.62	1218.45	3.42	1218.65	3.61	1218.46
	Piez#4/5.76	1222.07	4.68	1217.39	5.01	1217.06	4.45	1217.62	4.36	1217.71	4.20	1217.87
	WTW /5.03	1222.05	3.59	1218.46	4.01	1218.04	4.00	1218.05	1.66	1220.39	2.80	1219.25

APPENDIX B. WATER LEVEL DATA continued

Well Number	Type/Depth (m)	1985-05-15		1985-08-08		1986-01-29		1986-03-13		1986-06-03		
		Monitor Ground Elev.(m)	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Site #15	Piez#1/8.97	1213.65	4.24	1209.41	--	--	3.88	1209.77	3.34	1210.31	3.37	1210.28
	WTW /8.74	1213.65	4.40	1209.25	4.75	1208.90	3.79	1209.86	--	--	3.59	1210.06
Site #16	Piez#1/9.90	1210.89	7.20	1203.69	8.18	1202.71	7.44	1203.45	7.29	1203.60	7.02	1203.83
	Piez#2/5.20	1210.89	Dry	--	Dry	--	Dry	--	Dry	--	3.89	1207.00
Site #17	WTW /4.85	1211.03	5.56	1205.47	5.97	1205.06	5.56	1205.47	5.51	1205.52	3.40	1207.63
	WTW#a"/3.32	1210.87	Dry	--	Dry	--	Dry	--	Dry	--	2.99	1207.88
	Piez#1/11.93	1206.57	9.88	1196.69	9.88	1196.69	9.91	1196.66	9.86	1196.71	9.93	1196.64
	WTW /8.20	1206.57	Dry	--	Dry	--	Dry	--	Dry	--	--	--
Site #18	Piez#1/12.27	1203.76	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
Site #19	Piez#1/10.39	1198.88	6.42	1192.46	7.62	1191.26	6.58	1192.30	6.44	1192.44	5.99	1192.89
	Piez#2/6.76	1198.88	5.56	1193.32	5.73	1193.15	5.74	1193.14	4.86	1194.02	4.43	1194.45
Site #20	Piez#3/2.87	1198.88	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
	WTW /1.41	1199.08	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
	Piez#1/8.93	1196.94	1.33	1195.61	1.89	1195.05	1.01	1195.93	0.82	1196.12	0.76	1196.18
	Piez#2/7.39	1196.94	1.20	1195.74	2.33	1194.61	0.94	1196.00	0.72	1196.22	0.41	1196.53
Site #21	Piez#3/5.85	1196.94	--	--	--	--	--	--	--	--	--	--
	Piez#4/4.49	1196.94	1.48	1195.46	2.75	1194.19	1.36	1195.58	1.09	1195.85	0.62	1196.32
	WTW /4.02	1196.96	1.67	1195.29	2.26	1194.70	--	--	--	--	--	--

APPENDIX B. WATER LEVEL DATA continued

Well Number	Type/depth (m)	1985-05-15		1985-08-08		1986-01-29		1986-03-13		1986-06-03	
		Monitor Elev.(m)	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth
Site #21	Piez#1/6.45	1204.32	Dry	--	Dry	--	Dry	--	Dry	--	--
	Piez#2/4.51	1204.32	Dry	--	Dry	--	Dry	--	Dry	--	--
	WTW /7.53	1204.31	6.41	1197.90	6.47	1197.84	--	1198.02	6.17	1198.14	--
Site #22	Piez#1/11.43	1207.75	2.63	1205.12	2.87	1204.88	2.50	1205.25	2.58	1205.17	2.79
	Piez#2/10.23	1207.75	2.72	1205.03	2.81	1204.94	2.54	1205.21	2.59	1205.16	2.77
	Piez#3/6.80	1207.75	5.13	1202.62	4.90	1202.85	5.17	1202.58	--	--	5.36
	Piez#4/5.52	1207.75	4.96	1202.79	4.91	1202.84	4.92	1202.83	4.94	1202.81	4.99
	Piez#5/2.93	1207.75	Dry	--	Dry	--	Dry	--	Dry	--	--
Site #23	Piez#1/5.78	1214.34	3.08	1211.26	3.11	1211.23	3.11	1211.23	3.14	1211.20	3.26
	Piez#2/5.12	1214.34	3.09	1211.25	3.15	1211.19	3.14	1211.20	3.17	1211.17	3.29
	WTW /4.16	1214.28	3.41	1210.87	3.46	1210.82	Mud	--	3.21	1211.07	Dry
Site #24	Piez#1/6.11	1223.05	3.13	1219.92	3.17	1219.88	2.87	1220.18	2.91	1220.14	2.92
	Piez#2/4.40	1223.05	3.06	1219.92	3.12	1219.93	2.88	1220.17	2.85	1220.20	2.87
	WTW /3.38	1222.93	2.78	1220.15	2.88	1220.05	2.82	1220.11	2.73	1220.20	2.52
Site #25	Piez#1/10.28	1201.23	1.61	1199.23	2.08	1198.76	1.49	1199.35	1.40	1199.44	1.20
	Piez#2/8.94	1201.23	2.11	1198.73	3.42	1197.42	2.02	1198.82	1.86	1198.98	1.62
	Piez#3/4.59	1201.23	1.67	1199.17	1.80	1198.96	1.21	1199.63	1.15	1199.69	0.84
	Piez#4/4.00	1201.23	1.87	1198.97	2.75	1198.09	1.74	1199.10	1.54	1199.30	1.14
	WTW /2.71	1201.06	1.43	1199.35	1.98	1198.86	1.08	1199.70	1.10	1199.68	0.94

APPENDIX B. WATER LEVEL DATA continued

Well Number	Type/Depth (m)	Monitor Ground Elev.(m)	1985-05-15		1985-08-08		1986-01-29		1986-03-13		1986-06-03	
			Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Site #26	Piez#1/10.67	1201.90	3.52	1199.65	4.98	1196.95	2.13	1199.80	1.75	1200.18	1.12	1200.81
	Piez#2/9.26	1201.90	1.27	1200.65	3.52	1198.40	1.30	1200.62	1.06	1200.86	0.68	1201.24
	Piez#3/6.30	1201.90	1.14	1200.76	1.84	1200.06	0.95	1200.95	Frozen	--	0.27	1201.63
	Piez#4/5.48	1201.90	1.43	1200.51	1.55	1200.39	0.91	1201.03	0.78	1201.16	0.09	1201.85
	WTW /3.74	1201.90	1.33	1200.47	1.49	1200.31	0.84	1201.06	0.76	1201.14	0.43	1201.47
Site #27	Piez#1/11.92	1202.68	2.09	1200.57	2.32	1200.36	1.84	1200.84	1.67	1201.01	1.02	1201.66
	WTW /4.35	1202.71	2.12	1200.59	2.35	1200.36	1.81	1200.90	1.67	1201.04	1.07	1201.64
	WTW#a"/10.78	1202.73	2.15	1200.58	2.41	1200.32	1.81	1200.92	1.66	1201.07	1.05	1201.68
	Piez#1/8.46	1206.12	3.56	1202.59	3.86	1202.29	3.26	1202.89	2.81	1203.34	2.52	1203.63
Site #28	Piez#2/3.32	1206.12	Dry	--	Dry	--	2.28	1203.20	2.22	1203.26	2.18	1203.30
	Piez#3/1.46	1206.12	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
	WTW /5.44	1205.05	2.23	1202.79	2.79	1202.27	Frozen	--	1.21	1203.85	1.32	1203.74
Site #29	WTW /5.72	1215.77	3.36	1212.41	3.26	1212.51	3.03	1212.74	--	--	--	--
Site #30	WTW /5.71	1215.46	4.80	1210.66	4.58	1210.88	4.41	1211.05	--	--	--	--
Site #31	CH ₄ Well/5.76	1219.02	--	--	--	--	--	--	--	--	--	--
Site #32	CH ₄ Well/5.57	1221.54	--	--	--	--	--	--	--	--	--	--
Site #33	WTW /6.06	1219.85	5.00	1214.85	5.70	1214.15	--	--	--	--	--	--
Site #34	Piez#1/5.86	1231.83	Dry	--	Dry	--	Dry	--	Dry	--	Dry	--
Site #35	Piez#1/12.15	1211.85	2.44	1209.41	--	--	5.97	1205.88	5.79	1206.06	5.60	1206.25
Site #36	Piez#2/5.49	1211.85	3.78	1208.07	--	--	3.75	1208.10	3.77	1208.08	3.59	1208.26
	WTW /5.76	1210.68	5.04	1205.63	5.01	1205.66	4.70	1205.98	4.48	1206.20	--	--

APPENDIX C

APPENDIX C1 LIST OF PARAMETERS AND PRESERVATION TECHNIQUES

C2 GROUNDWATER CHEMISTRY ANALYSES

C1 SAMPLING PROCEDURES AND PRESERVATION TECHNIQUES

Chemical Parameter	Method of Preservation
Inorganic	
Cl, SO ₄ , HCO ₄ , NH ₄	- 250 ml plastic bottle
Na, K, Ca, Mg	- refrigerate
Organic	
COD	- 125 ml plastic bottle
	- acidify 1.5 ml (1:1) H ₂ SO ₄
Metals	
Cu, Fe, Mn, Pn, Zn	- 30 ml plastic bottle
	- acidify 0.5 ml (1:1) HNO ₃
	- refrigerate

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1982-09-14)

Well Number	Site 1		Site 2		WTW	Site 3		Piez1	Piez2	Piez3	Piez4
	Piez1	Piez2	Piez3	WTW		Piez1	Piez2				
Lab Data											
pH	8.3	8.3	8.0	8.1	8.1	7.9	12.2	8.4	8.0		
EC (mS/cm)	1.41	1.25	1.26	1.71	1.34	3.99	4.38	1.85	2.35		
SAR	12.0	8.4	3.6	8.7	5.5	9.1	5.0	6.9	6.0		
LAB ANALYSIS											
Inorganic (mg/L)											
Hardness	117.5	165.0	360.0	235.0	270.0	1375.0	700.0	340.0	585.0		
Ca	25.0	34.0	77.0	38.0	50.0	226.0	280.0	58.0	116.0		
Mg	13.36	19.44	40.7	34.02	35.2	196.8	0.05	47.3	71.6		
Na	299.0	248.4	158.7	308.2	209.3	846.4	303.6	292.1	331.2		
HCO3	818.01	837.53	555.7	611.83	554.4	719.1	192.42	376.98	491.6		
Cl	7.09	3.54	7.09	33.67	88.62	10.63	5.31	5.31	12.40		
SO4	122.4	31.2	259.2	345.6	259.2	2611.2	691.2	648.0	854.4		
K	4.69	3.12	4.30	3.12	3.12	3.51	6.25	4.69	5.08		
NO3-N	<0.05	<0.05	<0.05	2.20	2.50	0.05	0.20	<0.05	6.9		
TDS (mg/L)	878.0	752.0	823.0	1073.0	850.0	4249.0			1663.0		
Metals (mg/L)											
Fe		0.94	1.37	0.17	0.07	0.14	0.05	0.11	0.03		
Mn		0.28	0.28	0.03	0.01	0.10	0.01	0.03	0.06		
Cu		0.02	0.01	0.01	<0.01	0.02	0.02	0.01	0.01		
Zn		0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
Pb		0.29	0.05	0.03	0.04	<0.06	0.06	<0.05	0.06		
Organic (mg/L)											
COD	360.0	19.4	127.0	19.6	19.6	58.8	19.6	29.4	19.6		
TOC	16.5	82.5	125.0	39.0	43.5	31.5	30.0	18.0	37.5		
TIC	132.5	132.5	92.5	111.0	94.5	120.0	58.5	109.5	136.5		
TC	297.5	215.0	217.5	150.0	138.0	151.5	88.5	127.5	174.0		

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1982-09-14) continued

Well Number	Site 4		Site 5		Site 7		Site 8		Site 9A	
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ1	PIEZ2	PIEZ1	PIEZ2	WTW	PIEZ1
<u>Lab Data</u>										
pH	8.0	7.6	7.8	7.5	7.9	7.9	7.8	7.8	7.7	8.0
EC (mS/cm)	4.72	7.2	5.4	5.2	4.7	5.3	3.4	3.7	4.2	5.0
SAR	6.5	7.6	6.7	7.0	3.6	3.5	1.1	2.4	2.8	3.9
<u>LAB ANALYSIS</u>										
<u>Inorganic (mg/L)</u>										
Hardness	1710.0	3190.0	2140.0	1935.0	2485.0	2935.0	2195.0	2095.0	2315.0	2615.0
Ca	342.0	384.0	378.0	400.0	444.0	414.0	482.0	360.0	394.0	358.0
Mg	207.7	541.89	290.38	227.20	334.1	461.7	240.57	290.38	323.19	417.96
Na	616.4	986.7	713.0	713.0	409.4	441.6	115.0	250.7	305.9	460.0
HCO ₃	436.76	734.4	383.69	422.12	550.83	339.16	433.7	700.2	630.74	608.78
Cl	5.31	17.72	17.72	21.27	14.18	56.72	3.54	40.76	21.27	40.76
SO ₄	2702.4	4531.2	3307.2	2937.6	2937.6	3489.6	2030.4	1900.8	2428.8	3062.4
K	8.60	17.98	10.94	12.12	12.12	13.6	8.6	4.3	4.69	7.03
NO ₃ -N	3.3	0.1	4.4	0.1	0.5	6.7	0.1	2.1	0.2	0.6
TDS (mg/L)	4112.0	6845.0	4926.0	4528.0	4425.0	5075.0	3095.0	3201.0	3790.0	4649.0
<u>Metals (mg/L)</u>										
Fe	0.14	0.62	0.09	0.08	0.04	0.04	0.04	0.02	0.15	0.65
Mn	0.09	0.81	0.08	0.18	0.84	0.84	1.05	0.01	0.86	0.44
Cu	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Zn	0.02	0.02	0.01	0.02	0.02	0.02	0.09	0.01	0.02	0.02
Pb	0.07	0.13	0.12	0.11	0.11	0.11	0.11	0.10	0.12	0.11
<u>Organic (mg/L)</u>										
COD	29.4	99.2	29.8	49.6	69.4	69.4	9.9	39.7	39.7	49.6
TOC	42.0	58.5	21.0	22.0	42.0	42.0	10.0	47.0	33.0	31.5
TIC	76.5	99.0	66.0	61.0	99.0	99.0	89.0	100.0	118.5	121.5
TC	118.5	157.5	87.0	83.0	141.0	141.0	99.0	147.0	151.5	153.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1982-09-14) continued

Well Number	Site 9B		Site 9C		Site 9D		Site 9E		Site 9F		Site 9G	
	WTW	PIEZ1	WTW	WTW	WTW	WTW	WTW	WTW	WTW	WTW	WTW	WTW
<u>Lab Data</u>												
pH	8.0	8.4	8.0		7.6		7.1		7.5		8.1	
EC (mS/cm)	3.5	2.6	3.4		5.3		5.0		5.5		6.2	
SAR	2.0	2.3	2.3		2.3		1.3		1.8		4.1	
<u>LAB ANALYSIS</u>												
<u>Inorganic (mg/L)</u>												
Hardness	2080.0	755.0	1915.0		3490.0		3445.0		3825.0		3570.0	
Ca	256.0	122.0	172.0		604.0		712.0		674.0		408.0	
Mg	349.9	109.35	360.8		470.2		404.59		520.02		619.65	
Na	211.9	142.6	232.3		310.5		179.4		250.7		558.9	
HCO ₃	1300.52	1626.8	1052.25		857.05		1290.76		1641.5		1087.02	
Cl	24.8	33.67	14.18		163.07		26.58		88.6		12.40	
SO ₄	1382.4	105.6	1468.8		3120.0		2875.2		2937.6		3916.0	
K	2.34	39.8	4.30		22.6		18.7		8.9		5.47	
NO ₃ -N	2.0	<0.1	3.0		<0.1		<0.1		<0.1		<0.1	
TDS (mg/L)	2876.0	1563.0	2784.0		5115.0		4866.0		5300.0		6057.0	
<u>Metals (mg/L)</u>												
Fe	0.03		0.02		0.47		1.40		5.49		0.04	
Mn	0.02		0.05		0.89		15.9		13.7		0.10	
Cu	0.02		0.02		0.03		0.03		0.03		0.03	
Zn	0.01		0.01		0.02		0.01		0.02		0.02	
Pb	0.08		0.07		0.12		0.14		0.13		0.13	
<u>Organic (mg/L)</u>												
COD	29.8		39.7		109.0		179.0		149.0		49.6	
TOC	51.0		30.0		90.0		110.5		55.0		24.0	
TIC	169.5		168.0		135.0		214.5		340.0		175.5	
TC	220.5		198.0		225.0		325.0		395.0		199.5	

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1982-09-14) continued

Well Number	Site 9H		Site 10		Site 11		Site 13	
	WTW	PIEZ1	WTW	PIEZ1	WTW	PIEZ1	PIEZ2	PIEZ1
<u>Lab Data</u>								
pH	8.2	8.1	8.2	8.0	8.2	8.1	8.1	8.5
EC (mS/cm)	1.5	4.4	2.2	3.0	1.2	2.5	3.3	2.9
SAR	1.2	3.3	2.3	1.8	1.5	2.2	0.9	1.9
<u>LAB ANALYSIS</u>								
<u>Inorganic (mg/L)</u>								
Hardness	745.0	2360.0	990.0	1620.0	520.0	1180.0	2160.0	1205.0
Ca	104.0	426.0	144.0	332.0	116.0	264.0	494.0	266.0
Mg	117.8	314.68	153.09	191.97	55.89	126.36	224.7	131.2
Na	73.6	486.17	165.6	170.2	80.5	170.2	92.0	154.1
HCO ₃	771.04	372.6	448.96	466.04	431.8	440.42	412.97	313.54
Cl	5.31	8.86	26.58	49.63	5.31	24.81	24.81	24.81
SO ₄	283.2	2755.2	916.8	1468.8	345.6	1147.2	1968.0	1209.6
K	1.95	9.77	1.17	1.95	4.3	5.47	9.3	8.9
NO ₃ -N	0.8	<0.1	0.2	<0.1	<0.1	0.1	0.3	2.9
TDS (mg/L)	969.0	4129.0		2446.0	821.0	1956.0	3019.0	1972.0
<u>Metals (mg/L)</u>								
Fe	0.02	0.50	0.50		1.25	0.97	0.73	
Mn	<0.01	0.29	0.29		0.47	1.16	0.26	
Cu	0.01	0.02	0.02		0.01	0.01	0.02	
Zn	0.01	0.02	0.02		0.02	0.01	0.01	
Pb	0.06	0.09	0.09		0.04	0.08	0.09	
<u>Organic (mg/L)</u>								
COD	29.8	204.0	49.6		107.0	77.8	48.6	
TOC	65.0	10.10	30.0		63.0	46.5	43.5	
TIC	107.5	76.0	70.0		69.2	81.0	76.5	
TC	172.5	177.0	100.0		132.0	127.5	120.0	

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1982-09-14) continued

Well Number	Site 14			Site 15			Site 16			Site 19		
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW	PIEZ1	WTW	PIEZ1	WTW	PIEZ2	
Lab Data												
pH	8.2	7.9	7.6	7.9	8.3	7.9	7.6	8.1			7.9	
EC (mS/cm)	1.71	5.2	5.81	1.61	1.33	5.1	2.4	2.3			4.3	
SAR	8.4	10.1	10.4	7.2	7.9	3.9	1.5	2.3			4.5	
LABA ANALYSIS												
Inorganic (mg/L)												
Hardness	240.0	1420.0	1665.0	270.0	182.5	2550.0	1180.0	1080.0			1890.0	
Ca	51.0	324.0	386.0	57.0	39.0	318.0	210.0	220.0			404.0	
Mg	27.3	148.23	170.1	30.9	20.6	426.46	159.16	128.79			213.8	
Na	299.0	874.0	972.9	271.4	234.6	457.7	117.3	172.5			450.8	
HCO ₃	513.0	704.5	760.6	577.6	502.6	438.59	974.79	608.7			349.53	
Cl	17.72	3.54	8.86	10.6	10.6	33.67	7.09	1.77			5.31	
SO ₄	456.0	2760.0	3182.4	398.4	302.4	3120.0	734.4	916.8			2510.4	
K	3.9	8.2	8.6	3.9	3.9	10.5	11.3	6.25			14.4	
NO ₃ -N	0.25	<0.5	<0.5	0.30	0.25	4.9	0.1	0.1			0.9	
TDS (mg/L)	1108.0	4468.0	5099.0	1056.0	871.0	4605.0	1748.0	1748.0			3776.0	
Metals (mg/L)												
Fe	0.07		0.52	0.13		0.05	0.13	0.54			0.03	
Mn	0.02		0.61	0.05		0.06	0.81	0.36			0.79	
Cu	0.01		0.02	0.01		0.03	0.02	0.02			0.03	
Zn	0.01		0.01	0.01		0.01	0.02	0.01			0.02	
Pb	0.04		0.09	0.02		0.11	0.10	0.06			0.09	
Organic (mg/L)												
COD	29.4		19.6	19.6		49.6	248.0	29.8			29.8	
TOC	33.5		18.0	40.5		42.5	87.0	36.0			36.0	
TIC	89.5		153.0	94.5		76.5	263.0	94.5			94.5	
TC	123.0		171.0	135.0		119.0	350.0	130.5			130.5	

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1982-09-14) continued

Well Number	Site 20				Site 22				
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	PIEZ1	PIEZ2	PIEZ3	PIEZ4
Lab Data									
pH	7.8	8.25	8.2	8.0	8.3	8.4	8.3	8.5	8.6
EC (mS/cm)	6.7	2.6	1.9	3.2	2.4	2.5	2.4	2.1	2.1
SAR	12.1	5.7	5.0	5.9	5.0	54.0	31.9	14.9	14.5
LAB ANALYSIS									
Inorganic (mg/L)									
Hardness	1890.0	700.0	520.0	1015.0	720.0	25.0	60.0	165.0	172.5
Ca	350.0	136.0	108.0	212.0	122.0	5.0	11.0	35.0	36.0
Mg	246.64	87.48	60.75	117.85	100.8	3.03	7.89	18.8	20.04
Na	1214.4	345.0	262.2	434.7	305.9	621.0	568.1	441.6	439.3
HCO3	1137.04	531.92	570.35	525.21	441.03	1223.05	1225.49	697.23	640.5
Cl	31.9	8.86	7.09	30.13	14.18	223.33	186.11	14.18	14.18
SO4	3427.2	1017.6	604.8	1425.6	1017.6	12.0	24.0	484.8	524.4
K	3.1	6.25	5.0	5.08	5.0	1.5	1.9	2.3	2.73
NO3-N	0.2	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.5
TDS (mg/L)	5836.0	1863.0	1329.0	2484.0	1784.0	1509.0	1403.0	1356.0	1390.0
Metals (mg/L)									
Fe		0.31	0.71	0.22					
Mn		0.33	0.33	0.18					
Cu		0.01	0.02	0.02					
Zn		< 0.01	< 0.01	0.01					
Pb		0.05	0.04	0.08					
Organic (mg/L)									
COD		19.8	39.7		29.8				
TOC	110.0	38.5	43.0	37.0					
TIC	120.0	93.5	99.0	66.5					
TC	230.0	132.0	141.0	103.5					

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01)

Well Number	Site 1			Site 2			Site 3				
	PIEZ1	PIEZ2	PIEZ3	WTW	PIEZ1	PIEZ2	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4
Lab Data											
pH	8.1	8.1	7.9	8.1	8.2	8.1	8.0	7.9	12.1	8.0	8.0
EC (mS/cm)	1.35	1.04	1.48	1.65	1.33	1.31	4.98	3.91	3.97	2.0	2.28
SAR	10.5	7.7	4.0	8.8	15.0	5.4	11.9	9.5	5.9	6.3	6.2
LAB ANALYSIS											
Inorganic (mg/L)											
Hardness	140.0	140.0	440.0	230.0	77.5	290.0	1130.0	920.0	605.0	480.0	580.0
Ca	24.0	30.0	94.0	41.0	17.0	60.0	166.0	200.0	244.0	92.0	110.0
Mg	19.44	15.79	49.81	30.98	8.50	34.02	100.8	100.8	< 0.05	60.75	74.1
Na	285.2	209.3	190.9	308.2	303.6	211.6	920.0	664.7	335.8	303.6	342.7
HCO3	789.95	700.28	538.6	612.44	810.8	556.3	730.1	631.35	188.36	582.5	488.0
Cl	5.31	7.09	5.31	30.13	8.86	7.09	7.09	5.31	5.31	8.86	10.63
SO4	124.8	38.4	398.4	369.6	72.0	278.4	2361.6	1742.4	724.8	648.0	830.4
K	39.1	3.51	4.30	3.12	4.69	3.51	2.34	5.08	8.21	4.69	5.08
NO3-N	0.20	0.05	1.50	2.25	3.45	2.50	0.10	0.10	0.30	3.45	6.50
TDS (mg/L)	853.0	650.0	1020.0	1090.0	833.0	879.0	3990.0				1640.0
Metals (mg/L)											
Fe	0.13	0.62	0.32	0.04	0.49	0.07	0.20	0.78	0.06	0.31	0.08
Mn	0.07	0.13	0.16	0.01	0.07	0.04	0.17	0.56	0.01	0.15	0.09
Cu	<0.01	<0.01	0.01	0.01	0.01	<0.01	0.01	0.01	0.01	0.01	< 0.01
Zn	0.01	0.02	0.01	0.01	0.06	0.02	0.01	0.01	0.01	0.01	0.02
Pb	0.03	0.03	0.03	0.05	0.03	0.03	0.10	0.05	0.05	0.05	0.05
Organic (mg/L)											
COD	146.0	10.0		<10.0	58.0	<10.0	39.0	<10.0	10.0	10.0	19.0
TOC	140.0	80.0		70.0	185.0	30.0	120.0	110.0	9.0	70.0	60.0
TIC	190.0	150.0		150.0	200.0	160.0	150.0	160.0	5.0	130.0	130.0
TC	330.0	230.0		220.0	385.0	190.0	270.0	270.0	14.0	200.0	190.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01) continued

Well Number	Site 4		Site 5		Site 7		Site 8		Site 9A	
	WTW	PIEZ1	PIEZ1	PIEZ2	PIEZ1	PIEZ2	PIEZ1	PIEZ2	WTW	PIEZ1
<u>Lab Data</u>										
pH	7.9	7.3	7.6	8.1	7.6	7.6	7.4	7.4	7.6	7.6
EC (mS/cm)	4.61	7.61	5.41	4.76	5.21	3.47	3.47	3.68	3.65	3.98
SAR	6.9	7.8	6.9	3.7	3.4	1.1	1.1	2.4	2.9	2.9
LAB ANALYSIS										
<u>Inorganic (mg/L)</u>										
Hardness	1610.0	3415.0	2100.0	2440.0	2835.0	2230.0	2010.0	1845.0	2130.0	
Ca	314.0	420.0	378.0	440.0	398.0	490.0	342.0	298.0	378.0	
Mg	200.4	574.69	280.66	325.6	447.12	244.2	280.65	267.3	287.95	
Na	637.1	1046.5	726.8	416.3	416.3	115.0	243.8	287.5	303.6	
HCO ₃	425.78	752.74	381.25	539.85	325.7	437.3	726.51	608.78	488.6	
Cl	5.31	17.72	15.95	10.63	63.8	3.54	51.40	47.85	12.4	
SO ₄	2548.8	4800.0	3148.8	2822.4	3257.4	2059.2	1848.0	1876.8	2299.2	
K	7.82	18.37	10.55	12.12	13.2	8.6	4.3	5.47	4.69	
NO ₃ -N	2.45	< 0.05	4.00	< 0.05	5.60	< 0.05	1.45	0.23	0.10	
TDS (mg/L)	3930.0	7250.0	4770.0	4290.0	4878.0	3140.0	3130.0	3080.0	3530.0	
<u>Metals (mg/L)</u>										
Fe	0.08	7.3	0.35	1.25	0.08	0.58	0.11	1.84	1.27	
Mn	0.05	2.0	0.09	1.40	0.48	1.65	0.05	1.13	1.27	
Cu	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	
Zn	0.01	0.02	0.02	0.05	0.05	0.06	0.06	0.02	0.02	
Pb	0.05	0.13	0.13	0.13	0.13	0.10	0.10	0.10	0.01	
<u>Organic (mg/L)</u>										
COD	29.0	69.4	19.8	29.7	79.4	9.8	39.2	39.2		
TOC	70.0	150.0	80.0	110.0	120.0	100.0	100.0	110.0		
TIC	110.0	160.0	110.0	120.0	60.0	150.0	100.0	120.0		
TC	180.0	310.0	190.0	230.0	180.0	250.0	200.0	230.0		

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01) continued

Well Number	Site 9B		Site 9C		Site 9D		Site 9F		Site 9G	
	WTW	PIEZ1	WTW	WTW	WTW	WTW	WTW	WTW	WTW	WTW
<u>Lab Data</u>										
pH	7.6	8.3	7.5	7.7			7.0		7.8	
EC (mS/cm)	3.5	2.27	3.90	6.17			5.33		4.93	
SAR	2.0	2.2	2.8	3.0			1.7		3.4	
<u>LAB ANALYSIS</u>										
<u>Inorganic (mg/L)</u>										
Hardness	2035.0	770.0	2130.0	3700.0			3650.0		2705.0	
Ca	252.0	132.0	192.0	534.0			662.0		410.0	
Mg	341.41	106.92	400.9	574.6			484.7		403.24	
Na	211.6	138.0	294.4	425.5			236.9		404.8	
HCO ₃	1360.3	1650.05	1135.21	1014.4			1607.3		592.31	
Cl	31.9	10.6	19.49	272.96			102.8		17.72	
SO ₄	1348.8	31.2	1689.6	3302.4			2596.8		2976.0	
K	3.12	12.9	5.47	21.5			6.6		7.82	
NO ₃ -N	<0.05	<0.05	2.95	<0.05			<0.05		<0.05	
TDS (mg/L)	314.0	1370.0	3170.0	5630.0			4890.0		4250.0	
<u>Metals (mg/L)</u>										
Fe	0.19	0.30	0.21				4.3		0.05	
Mn	0.19	0.88	0.15				15.4		0.33	
Cu	0.01	0.01	0.01				0.03		0.02	
Zn	0.01	0.03	0.04				0.02		0.03	
Pb	0.10	0.05	0.05				0.13		0.10	
<u>Organic (mg/L)</u>										
COD			29.4				157.0		39.2	
TOC			140.0				170.0		100.0	
TIC			210.0				330.0		140.0	
TC			350.0				500.0		240.0	

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01) continued

Well Number	Site 10		Site 11		Site 13		
	WTW	PIEZ1	PIEZ2	PIEZ1	PIEZ2	PIEZ1	PIEZ2
Lab Data							
pH	8.1	7.3	8.0	7.6	7.5	7.3	7.8
EC (mS/cm)	2.31	4.79	2.37	1.21	2.38	3.3	1.82
SAR	1.8	3.6	2.3	1.5	2.1	0.9	2.0
LAB ANALYSIS							
<u>Inorganic (mg/L)</u>							
Hardness	1140.0	2545.0	1130.0	580.0	1155.0	2215.0	880.0
Ca	224.0	450.0	160.0	132.0	252.0	496.0	192.0
Mg	140.94	345.06	177.39	60.75	127.57	236.9	97.2
Na	142.6	418.6	179.4	80.5	165.6	101.2	138.0
HCO3	408.7	514.23	480.07	448.9	436.15	414.8	253.7
Cl	31.9	7.09	24.81	3.54	23.04	28.36	19.49
SO4	1032.0	2875.2	1032.0	345.6	1070.4	1953.6	859.2
K	4.30	10.16	1.17	5.8	5.86	10.5	7.8
NO3-N	0.50	1.45	<0.05	<0.05	<0.05	0.10	3.45
TDS (mg/L)	1780.0	4400.0	1810.0	848.0	1860.0	3030.0	1450.0
<u>Metals (mg/L)</u>							
Fe		1.98	0.21	0.92	1.0	1.3	
Mn		1.11	0.32	0.40	1.39	0.41	
Cu		0.02	0.01	0.01	0.01	0.02	
Zn		0.03	0.01	0.01	0.01	0.02	
Pb		0.13	0.05	0.05	0.05	0.10	
<u>Organic (mg/L)</u>							
COD		147.0	39.2	29.4	39.2		
TOC		130.0	100.0	60.0	97.0	70.0	
TIC		110.0	100.0	100.0	83.0	130.0	
TC		240.0	200.0	160.0	180.0	200.0	

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01) continued

Well Number	Site 14		Site 15		Site 16		Site 17	
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW	PIEZ1	WTW
<u>Lab Data</u>								
pH	8.3	7.3	7.6	7.8	8.1	7.4	8.1	7.9
EC (mS/cm)	1.81	5.78	5.67	1.84	1.52	4.67	3.28	2.26
SAR	9.0	11.6	10.7	7.9	8.8	3.2	1.2	2.7
<u>LAB ANALYSIS</u>								
<u>Inorganic (mg/L)</u>								
Hardness	275.0	1650.0	1580.0	330.0	205.0	2575.0	1680.0	1020.0
Ca	59.0	390.0	362.0	72.0	42.0	452.0	414.0	238.0
Mg	30.9	164.02	164.02	36.45	24.3	351.1	156.73	103.27
Na	342.7	989.0	982.1	328.9	289.8	368.0	117.3	195.5
HCO ₃	538.02	755.79	752.13	630.74	606.3	442.25	889.3	478.8
Cl	19.49	3.54	3.54	7.09	7.09	28.36	207.38	3.54
SO ₄	528.0	3000.0	2937.6	528.0	345.6	2899.2	897.6	979.2
K	3.12	7.03	7.03	3.12	3.91	8.6	12.12	5.86
NO ₃ -N	0.80	0.10	< 0.05	0.20	0.75	1.35	<0.05	6.40
TDS (mg/L)	1250.0	4850.0	4830.0	1290.0	1020.0	4330.0	2280.0	1760.0
<u>Metals (mg/L)</u>								
Fe	0.07	2.0	0.39	0.18		0.11	0.11	0.88
Mn	0.01	1.45	0.14	0.13		0.23	1.10	0.35
Cu	0.01	0.02	0.02	0.01		0.02	0.01	0.01
Zn	<0.01	0.01	0.02	0.01		0.05	0.03	0.01
Pb	0.03	0.13	0.10	0.03		0.13	0.15	0.05
<u>Organic (mg/L)</u>								
COD	10.0	58.0	10.0	10.0		19.6	755.0	19.6
TOC	40.0	140.0	100.0	60.0		98.0	150.0	50.0
TIC	160.0	190.0	200.0	150.0		82.0	310.0	130.0
TC	200.0	330.0	300.0	210.0		180.0	460.0	180.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01) continued

Well Number	Site 20			Site 21			Site 22			
	WTW	PIEZ1	PIEZ2	PIEZ3	WTW	PIEZ1	PIEZ1	PIEZ2	PIEZ3	PIEZ4
Lab Data										
pH	7.8	7.8	8.0	7.8	8.3	8.3	8.4	8.2	8.1	8.2
EC (mS/cm)	6.79	2.53	1.87	3.15	3.49	3.55	2.5	2.35	2.5	2.09
SAR	12.5	5.6	4.9	5.9	5.3	5.7	58.8	34.8	17.3	15.2
LAB ANALYSIS										
Inorganic (mg/L)										
Hardness	1915.0	765.0	540.0	1015.0	1250.0	810.0	22.5	52.5	195.0	170.0
Ca	366.0	166.0	112.0	212.0	256.0	134.0	5.0	11.0	42.0	36.0
Mg	243.0	85.05	63.18	117.85	148.2	115.4	2.43	6.07	21.87	19.44
Na	1253.5	356.5	2622.0	434.7	430.1	370.3	641.7	579.6	544.3	455.4
HCO3	1079.09	530.7	594.7	523.9	735.05	720.41	1295.64	1233.4	836.92	722.24
Cl	28.34	8.86	7.09	30.13	60.26	35.45	214.47	194.9	15.95	14.18
SO4	3451.2	1017.6	595.2	1392.0	1449.6	1339.2	14.4	14.4	686.4	556.8
K	2.34	4.3	3.91	4.69	8.9	23.8	1.5	1.56	2.3	2.37
NO3-N	1.00	<0.05	<0.05	<0.05	<0.05	0.30	<0.05	<0.05	0.10	0.50
TDS (mg/L)	5880.0	1900.0	1340.0	2450.0	2730.0	2530.0	1530.0	1410.0	1740.0	1440.0
Metals (mg/L)										
Fe		0.16	0.28	0.10	0.29	0.80	0.04	0.04	0.57	
Mn		0.42	0.36	0.22	0.45	0.31	0.01	0.06	0.24	
Cu		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Zn		0.04	0.01	0.02	0.04	0.01	0.01	0.01	0.01	
Cd		0.03	0.02	0.04	0.04	0.04	0.03	0.03	0.03	
Organic (mg/L)										
COD		10.0	29.0	29.0		59.0	39.0		19.0	
TOC		70.0	102.0	107.0		60.0	180.0	190.0	110.0	
TIC		120.0	98.0	93.0		120.0	310.0	270.0	190.0	
TC		190.0	210.0	200.0		180.0	490.0	460.0	300.0	

Well Number	Site 23			Site 24			Site 25		
WTW	PIEZ1	PIEZ2	WTW	PIEZ1	PIEZ2	WTW	PIEZ1	PIEZ2	PIEZ3
<u>Lab Data</u>									
pH	8.1	8.1	8.3	8.0	8.0	7.8	8.2	8.5	7.9
EC (mS/cm)	3.06	1.97	2.0	3.62	1.12	4.60	2.3	2.07	2.89
SAR	22.2	21.3	21.4	24.1	7.9	8.9	26.3	17.6	7.5
<u>LAB ANALYSIS</u>									
<u>Inorganic (mg/L)</u>									
Hardness	167.5	95.0	97.5	227.5	152.5	1365.0	87.5	135.0	745.0
Ca	34.0	17.0	18.0	40.0	33.0	252.0	17.0	24.0	154.0
Mg	20.04	12.75	12.75	30.98	17.01	178.6	10.9	18.2	87.4
Na	660.1	478.4	485.3	834.9	225.4	759.0	565.8	471.5	487.6
HCO ₃	1523.78	974.78	1010.7	743.59	664.29	637.45	930.2	765.5	681.9
Cl	72.67	8.86	10.63	7.09	7.09	10.63	23.04	26.58	14.18
SO ₄	345.6	302.4	292.8	1296.0	100.8	2294.4	508.8	432.0	1104.0
K	7.03	2.7	2.3	3.12	4.3	3.5	2.7	6.2	4.3
NO ₃ -N	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	0.55	<0.05
TDS (mg/L)	1950.0	1302.0	1330.0	2600.0	716.0	3810.0	3810.0	1380.0	2170.0
<u>Metals (mg/L)</u>									
Fe	0.45	0.25	0.36	0.29	0.39	0.19	0.03		1.10
Mn	0.23	0.12	0.15	0.35	0.18	0.56	0.03		0.28
Cu	0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01		0.01
Zn	0.02	0.01	0.01	0.01	0.01	0.02	0.01		0.01
Pb	0.03	0.03	0.03	0.05	0.03	0.08	0.03		0.05
<u>Organic (mg/L)</u>									
COD		29.0	29.0	29.0	19.0	29.0	<9.0		
TOC		110.0	110.0		90.0	115.0	160.0		
TIC		210.0	230.0		200.0	105.0	190.0		
TPC		320.0	340.0		290.0	226.0	350.0		

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1983-09-01) continued

Well Number	Site 26		Site 27		Site 27A		Site 28	
	WTW	PIEZ1	PIEZ3	WTW	PIEZ1	WTW	WTW	PIEZ1
<u>Lab Data</u>								
pH	7.7	7.3	7.7	7.7	8.1	7.7	7.8	7.7
EC (ms/cm)	4.61	3.3	2.98	5.6	2.58	5.0	1.6	1.2
SAR	9.2	5.7	6.2	7.1	11.4	5.9	2.6	5.6
LAB ANALYSIS								
<u>Inorganic (mg/L)</u>								
Hardness	1340.0	1160.0	880.0	2285.0	370.0	2125.0	675.0	187.5
Ca	270.0	244.0	176.0	358.0	82.0	336.0	144.0	43.0
Mg	161.5	133.6	106.9	337.7	40.0	312.2	76.5	19.4
Na	772.8	448.5	423.2	782.0	503.7	630.2	154.1	177.1
HCO ₃	620.9	566.0	788.12	521.5	596.5	491.05	472.7	858.8
Cl	31.9	8.8	10.63	3.5	3.5	3.5	3.5	5.3
SO ₄	2265.6	1598.4	1123.2	3249.6	940.8	2822.4	561.6	16.8
K	3.1	5.4	8.9	3.1	3.5	3.5	2.7	7.8
NO ₃ -N	< 0.05	0.10	< 0.05	0.30	< 0.05	1.35	< 0.05	< 0.05
TDS (mg/L)	3810.0	2720.0	2250.0	4990.0	1870.0	4360.0	1180.0	746.0
<u>Metals (mg/L)</u>								
Fe	0.60	0.29	0.22	0.09	0.26	0.12	0.28	3.08
Mn	0.84	0.72	0.58	0.07	0.20	0.13	0.26	0.34
Cu	0.01	0.01	0.01	0.02	< 0.01	0.02	0.01	< 0.01
Zn	0.01	0.02	0.01	0.02	0.03	0.02	0.02	0.02
Pb	0.08	0.07	0.05	0.10	0.04	0.09	0.05	0.03
<u>Organic (mg/L)</u>								
COD	29.0	20.0	49.0	39.0	39.0	39.0	10.0	29.0
TOC	110.0	80.0	130.0	99.0	80.0	50.0	170.0	130.0
TIC	130.0	130.0	130.0	91.0	130.0	110.0	110.0	160.0
TC	240.0	210.0	260.0	190.0	210.0	160.0	180.0	290.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19)

Well Number	Site 1		WTW	Site 2		Site 3			
	PIEZ1	PIEZ2		PIEZ1	PIEZ2	PIEZ1	PIEZ2	PIEZ3	PIEZ4
Lab Data									
pH	8.1	8.05	7.82	8.28	7.85	7.75	11.5	8.0	8.0
EC (mS/cm)	1.21	1.17	1.45	1.27	1.33	3.79	2.34	1.84	2.39
SAR	12.1	9.4	7.5	20.8	5.5	9.6	7.5	5.9	6.3
LAB ANALYSIS									
Inorganic (mg/L)									
Hardness	102.5	140.0	237.5	50.0	270.0	885.0	305.0	442.5	620.0
Ca	21.0	28.0	41.0	12.0	51.0	192.0	122.0	90.0	124.0
Mg	12.15	17.01	32.8	4.86	34.62	98.4	0.05	52.85	75.33
Na	280.6	255.3	266.8	338.1	209.3	657.8	301.3	287.5	361.10
HCO ₃	794.83	799.1	586.82		549.0	605.7	21.76	542.2	494.10
Cl	4.43	3.54	15.06	7.97	7.09	4.43	3.54	5.31	11.52
SO ₄	64.8	48.0	309.6	33.6	259.2	1785.6	744.0	604.8	931.2
K	3.12	2.73	2.34	2.34	3.12	6.25	4.69	4.30	4.69
NO ₃ -N	<0.05	<0.05	2.35	0.15	1.35	<0.05	0.10	0.10	6.35
TDS (mg/L)	778.0	748.0	967.0	841.0	841.0	3040.0	4210.0	1310.0	1780.0
Metals (mg/L)									
Fe	0.16	0.55	0.04	0.26	0.02	0.02	0.02	0.40	0.03
Mn	0.06	0.12	0.02	0.04	0.08	0.47	0.01	0.20	0.02
Cu	0.01	0.01	<0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zn	0.03	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01
Pb	0.02	0.04	0.05	0.04	0.06	0.10	0.07	0.02	0.06
Organic (mg/L)									
COD	29	19	19	68	10	10	10	19	29
TOC	4	1	2	1	3	6	2	4	6
TIC	144	135	86	196	82	69	2	65	51
TC	148	135	88	196	85	75	4	69	57

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19) continued

Well Number	Site 4		Site 5		Site 7		Site 8	
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ1	PIEZ2	PIEZ1	PIEZ2
<u>Lab Data</u>								
pH	7.9	7.3	7.73	7.87	7.63	7.48	7.33	7.27
EC (mS/cm)	4.72	7.56	4.92	5.02	4.43	4.97	3.39	3.49
SAR	6.7	7.5	6.4	6.7	3.3	3.1	1.0	2.3
<u>LAB ANALYSIS</u>								
<u>Inorganic (mg/L)</u>								
Hardness	1725.0	3525.0	1920.0	1625.0	2410.0	2880.0	2250.0	1930.0
Ca	366.0		346.0	374.0	456.0	430.0	500.0	334.0
Mg	208.98		256.36	228.42	308.61	438.61	243.0	266.08
Na	650.9		644.0	671.6	374.9	384.1	110.4	230.0
HCO ₃	460.5		339.16	495.93	519.11	308.05	420.9	647.82
Cl	6.2		14.18	17.72	7.97	52.2	2.65	49.63
SO ₄	2736.0		2880.0	2784.0	2649.6	3120.0	2107.2	1804.8
K	8.21		9.77	12.51	11.33	12.5	8.21	3.91
NO ₃ -N	0.90		3.25	0.60	0.05	4.9	0.15	1.35
TDS (mg/L)	2120.0		4330.0	4350.0	4060.0	4610.0	5050.0	3010.0
<u>Metals (mg/L)</u>								
Fe	0.30		0.03	1.45	0.83	0.06	0.06	0.07
Mn	0.42		0.09	0.68	0.97	0.45	1.42	0.04
Cu	0.02		0.02	0.02	0.02	0.02	0.02	0.01
Zn	0.02		0.02	0.04	0.07	0.06	0.05	0.03
Pb	0.09		0.11	0.08	0.10	0.09	0.09	0.09
<u>Organic (mg/L)</u>								
COD	29.0		19.0	29.0	10.0	40.0	< 10.0	40.0
TOC	12.0		7.0	19.0	10.0	12.0	7.0	10.0
TIC	51.0		52.0	52.0	54.0	38.0	44.0	76.0
TC	63.0		59.0	71.0	64.0	50.0	51.0	86.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19) continued

Well Number	Site 9A		Site 9B		Site 9C	Site 9D	Site 9F
	WTW	PIEZ1	WTW	PIEZ1	WTW	WTW	WTW
Lab Data							
pH	7.15	7.84	8.0	7.46	7.54	7.05	7.3
EC (mS/cm)	3.85	3.00	1.88	3.36	1.97	5.50	4.80
SAR	2.8	2.60	2.2	2.0	1.10	2.7	1.7
LAB ANALYSIS							
Inorganic (mg/L)							
Hardness	2090.0	1490.0	795.0	1920.0	1140.0	3310.0	3130.0
Ca	368.0	248.0	131.0	246.0	106.0	484.0	552.00
Mg	284.31	211.41	113.06	317.1	212.62	510.3	425.25
Na	299.0	232.3	140.3	204.7	851.0	361.1	216.2
HCO3	455.67	473.36	981.49	1410.32	1082.75	672.22	1362.13
Cl	8.86	46.97	6.20	28.36	2.65	203.83	101.91
SO4	2217.6	1516.8	1176.0	11.76	408.0	3139.2	2236.8
K	4.69	5.47	7.03	3.12	3.12	18.3	6.6
NO3-N	0.10	0.10	0.60	0.05	0.70	0.05	1.25
TDS (mg/L)	3410.0	2500.0	1270.0	2680.0	1350.0	5050.0	4220.0
Metals (mg/L)							
Fe	0.46	3.15	0.35	0.54	0.08	0.58	0.11
Mn	1.00	0.66	0.50	0.48	0.04	1.13	4.50
Cu	0.02	0.02	0.01	0.01	<0.01	0.02	0.03
Zn	0.02	0.04	0.01	0.03	0.02	0.02	0.04
Pb	0.08	0.13	0.04	0.07	0.07	0.13	0.13
Organic (mg/L)							
COD	20.0	30.0	30.0	69.0	20.0	120.0	120.0
TOC	1.0		18.0	2.0	6.0	8.0	32.0
TIC	61.0		140.0	164.0	150.0	98.0	134.0
TC	62.0		158.0	166.0	156.0	106.0	166.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19) continued

Well Number	Site 9G WTW	Site 10 WTW	Site 10 PIEZ1	Site 10 PIEZ2	Site 10A WTW	Site 11 PIEZ1	Site 11 PIEZ2
<u>Lab Data</u>							
pH	7.4	7.7	7.8	7.7	7.93	7.8	7.7
EC (mS/cm)	4.83	2.28	4.63	2.05	2.34	1.17	2.28
SAR	3.3	1.7	3.6	2.0	2.1	1.5	2.0
<u>LAB ANALYSIS</u>							
<u>Inorganic (mg/L)</u>							
Hardness	2700.0	1075.0	2550.0	1050.0	1210.0	555.0	1190.0
Ca	398.0	258.0	420.0	156.0	216.0	131.0	272.0
Mg	414.3	148.23	364.5	160.38	162.8	55.28	123.93
Na	391.0	135.7	420.9	151.8	170.2	80.5	161.0
HCO ₃	653.31	355.6	487.39	405.04	318.42	441.03	423.34
Cl	14.18	25.7	7.97	24.81	43.42	2.65	23.04
SO ₄	2832.0	1142.4	2952.0	955.2	1180.8	331.2	1084.8
K	7.03	1.9	11.73	1.54	2.3	5.08	5.6
NO ₃ -N	<0.05	<0.05	0.05	0.05	<0.05	<0.05	0.15
TDS (mg/L)	4380.0	1890.0	4420.0	1650.0	1930.0	823.0	1880.0
<u>Metals (mg/L)</u>							
Fe	1.08	0.40	0.60	0.30	0.32	1.06	0.05
Mn	1.30	0.21	0.92	0.26	0.16	0.44	1.07
Cu	0.02	<0.01	0.01	0.01	0.01	0.01	0.01
Zn	0.04	0.03	0.04	0.08	3.78	0.02	0.04
Pb	0.12	0.08	0.12	0.07	0.08	0.06	0.08
<u>Organic (mg/L)</u>							
COD	40.0	30.0	79.0	30.0	40.0	10.0	20.0
TOC	19.0	13.0	30.0	16.0	15.0	5.0	10.0
TIC	62.0	49.0	61.0	55.0	46.0	75.0	67.0
TC	81.0	62.0	91.0	71.0	61.0	80.0	77.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19) continued

Well Number	Site 13		Site 14		Site 15		Site 16	
	PIEZ1	PIEZ2	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW
<u>Lab Data</u>								
pH	7.66	7.73	8.2	8.2	7.45	8.3		7.7
EC (ms/cm)	3.26	2.92	1.95	5.24	5.67	1.61		3.3
SAR	0.9	1.9	8.7	10.5	10.6	7.9		2.6
<u>LAB ANALYSIS</u>								
<u>Inorganic (mg/L)</u>								
Hardness	2250.0	1630.0	320.0	1325.0	1660.0	277.5		1790.0
Ca	500.0	352.0	65.0	296.0	388.0	58.0		272.0
Mg	243.0	182.25	38.27	142.15	167.67	32.19		257.58
Na	94.3	177.1	358.8	880.9	993.6	303.6		250.7
HCO ₃	406.8	359.9	433.1	516.67	748.47	588.6		453.23
Cl	26.58	19.49	22.15	6.20	3.54	9.74		23.92
SO ₄	1982.4	1632.0	681.6	2696.6	302.4	405.6		1795.2
K	10.1	10.16	681.6	2696.6	302.4	405.6		1795.2
NO ₃ -N	<0.05	2.6	3.91	7.82	7.82	3.91		7.4
TDS (mg/L)	3060.0	2560.0	1386.0	4290.0	4950.0	1110.0		2860.0
<u>Metals (mg/L)</u>								
Fe	0.54	0.07	0.15	0.77	0.51	0.03		0.29
Mn	0.28	0.21	0.17	1.15	1.02	<0.01		0.13
Cu	0.01	0.01	<0.01	0.01	0.01	<0.01		0.01
Zn	0.10	0.15	0.03	0.09	0.04	0.02		0.04
Pb	0.11	0.11	0.05	0.11	0.13	0.06		0.10
<u>Organic (mg/L)</u>								
COD	30.0	40.0	20.0	60.0	10.0	10.0		30.0
TOC	13.0	16.0	10.0	17.0	14.0	3.0		8.0
TIC	67.0	55.0	58.0	70.0	108.0	92.0		65.0
TC	80.0	71.0	68.0	87.0	122.0	95.0		73.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1987-07-19) continued

Well Number	Site 20			Site 21			Site 23		
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW	WTW	PIEZ1	PIEZ2
<u>Lab Data</u>									
pH	7.95	7.67	7.83	7.7	7.8	7.77		7.8	8.2
EC (mS/cm)	6.29	2.48	1.83	3.21	2.4	3.30	1.87	1.8	1.89
SAR	12.0	5.6	4.9	5.9	4.6	4.9	13.7	18.7	19.1
<u>LAB ANALYSIS</u>									
<u>Inorganic (mg/L)</u>									
Hardness	1730.0	740.0	537.3	1055.0	840.0	1225.0	167.5	105.0	105.0
Ca	332.0	164.0	105.0	222.0	168.0	254.0	33.0	24.0	23.0
Mg	218.7	80.19	66.8	121.5	102.06	143.37	20.65	10.9	11.5
Na	1145.4	351.9	262.2	443.9	305.9	397.9	407.1	441.6	450.8
HCO ₃	991.25	519.11	552.6	526.43	525.82	522.77		980.88	936.3
Cl	23.92	9.74	7.09	30.13	15.95	47.85		16.83	11.52
CO ₄	3177.6	1032.0	614.4	1464.0	1003.2	1574.4	158.4	240.0	273.6
K	1.56	4.30	3.51	4.69	3.51	9.7	6.25	3.9	2.3
NO ₃ -N	0.05	<0.05	<0.05	<0.05	10.05	0.10	0.25	<0.05	0.05
TDS (mg/L)	5390.0	1900.0	1330.0	2540.0	1860.0	2700.0		1220.0	1230.0
<u>Metals (mg/L)</u>									
Fe	1.46	0.04	0.04	0.23	0.62	0.16	0.42	0.18	0.37
Mn	3.20	0.54	0.35	0.23	0.32	0.57	0.28	0.16	0.32
Cu	0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01
Zn	0.02	0.02	0.04	0.04	0.01	0.02	0.03	0.01	0.01
Pb	0.10	0.07	0.05	0.06	0.05	0.10	0.05	0.04	0.04
<u>Organic (mg/L)</u>									
COD	59.0	10.0	<10.0	10.0	20.0	69.0	178.0	79.0	<10.0
TOC	28.0	10.0	4.0	15.0	9.0	17.0	72.0	24.0	3.0
TIC	90.0	68.0	86.0	57.0	71.0	69.0	200.0	180.0	185.0
TC	118.0	70.0	90.0	72.0	80.0	86.0	272.0	204.0	188.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19) continued

Well Number	Site 25				Site 26					
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4
Lab Data										
pH	7.9	8.2	8.2	8.0	8.0	7.48	7.23	7.3	7.5	7.26
EC (mS/cm)	4.2	2.38	2.01	2.71	2.86	5.36	3.3	6.3	2.96	6.62
SAR	9.3	26.3	17.0	7.2	7.8	10.7	5.6	10.7	5.8	9.8
LAB ANALYSIS										
<u>Inorganic (mg/L)</u>										
Hardness	1405.0	87.5	137.5	680.0	690.0	1380.0	1155.0	1945.0	930.0	2140.0
Ca	240.0	23.0	34.0	139.0	138.0	270.0	246.0	358.0	194.0	380.0
Mg	195.6	7.29	12.76	80.8	83.8	171.31	131.22	255.15	108.13	289.17
Na	802.7	565.8	457.7	432.4	471.5	910.8	439.3	1083.3	404.8	1046.5
HCO ₃	645.38	925.37	850.3	633.79	680.15	532.5	565.4	742.98	676.4	753.96
Cl	12.4	23.04	15.07	11.52	14.18	38.9	0.95	14.18	11.52	15.06
SO ₄	2476.8	499.2	396.0	1008.0	1075.2	2608.0	1536.0	3427.2	1176.0	3667.2
K	3.5	2.7	3.13	5.0	3.9	3.5	5.4	8.6	7.0	7.8
NO ₃ -N	0.005	0.01	0.005	0.35	0.005	0.10	0.005	0.005	< 0.005	0.005
TDS (mg/L)	4050.0	1580.0	1340.0	1990.0	2120.0	4340.0	2640.0	5510.0	2240.0	5780.0
<u>Metals (mg/L)</u>										
Fe	0.75	0.02	0.16	0.45	0.69	0.10	0.47	1.18	0.18	2.18
Mn	0.62	0.02	0.09	0.27	0.22	0.73	0.99	0.92	0.5	1.48
Cu	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.10	0.01	0.02	0.01	0.01
Zn	0.08	0.01	0.01	0.02	0.02	0.10	0.02	0.02	0.04	0.02
Pb	0.08	0.04	0.04	0.06	0.06	0.11	0.07	0.10	0.05	0.11
<u>Organic (mg/L)</u>										
COD	49.0	10.0	10.0	20.0	10.0	39.0	10.0	10.0	20.0	10.0
TOC	9.0	< 1.0	8.0	2.0	< 1.0	88.0	92.0	110.0	94.0	116.0
TIC	84.0	162.0	126.0	98.0	96.0	69.0	89.0	106.0	80.0	116.0
TC	93.0	162.0	134.0	100.0	96.0	88.0	92.0	110.0	94.0	116.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1984-07-19) continued

Well Number	Site 27 WTW	PIEZ1	Site 27A WTW	Site 28 WTW	PIEZ1	Site 29 WTW	Site 30 WTW	Site 33 WTW
<u>Lab Data</u>								
pH	7.5	7.8	7.67	7.65	7.8	7.0	6.72	7.7
EC (mS/cm)	5.77	1.53	5.15	1.3	0.93	4.08	4.13	3.89
SAR	6.9	8.1	5.8	2.1	5.4	3.1	1.5	8.2
<u>LAB ANALYSIS</u>								
<u>Inorganic (mg/L)</u>								
Hardness	2340.0	225.0	2220.0	565.0	160.0	2165.0	2680.0	1060.0
Ca	370.0	51.0	380.0	127.0	36.0	476.0	518.0	202.0
Mg	343.8	23.6	308.6	60.14	17.0	236.9	336.5	134.86
Na	768.2	278.3	623.2	115.0	156.4	331.2	177.1	616.4
HCO ₃	533.4	362.34	475.8	466.0	562.42	604.51	932.6	393.45
Cl	2.65	5.3	3.5	4.43	5.31	16.83	25.70	10.63
SO ₄	3408.0	484.8	2976.0	412.8	38.4	2270.0	2270.4	1982.4
K	3.5	3.5	3.9	2.7	5.4	7.4	10.1	7.03
NO ₃ -N	<0.005	0.155	0.625	0.005	0.005	< 0.005	0.005	0.95
TDS (mg/L)	5160.0	1040.0	4550.0	952.0	550.0	3640.0	3800.0	3150.0
<u>Metals (mg/L)</u>								
Fe	1.93	0.07	0.08	0.04	3.18	0.31	1.32	0.43
Mn	0.68	0.20	0.09	0.08	0.14	0.41	3.38	0.22
Cu	0.03	<0.01	0.02	0.01	<0.01	0.02	0.02	0.01
Zn	0.03	<0.01	0.02	0.01	<0.01	0.02	0.02	0.01
Pb	0.12	0.06	0.11	0.06	0.03	0.10	0.12	0.08
<u>Organic (mg/L)</u>								
COD	49.0	20.0	39.0	10.0	10.0	39.0	49.0	10.0
TOC	20.0	4.0	15.0	9.0	8.0	26.0	48.0	23.0
TIC	73.0	88.0	55.0	49.0	98.0	70.0	132.0	45.0
TC	93.0	70.0	92.0	58.0	106.0	96.0	180.0	68.0

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1985-06-11)

Well Number	Site 1		Site 2		Site 3		Site 5	
	Piez1	Piez2	WTW	Piez1	Piez2	PIEZ1	PIEZ2	Piez1
Lab Data								
pH	8.33	8.25	8.27	8.23	8.62	8.4	8.2	8.17
EC (mS/cm)	1.23	1.18	1.53	1.30	1.47	2.19	2.01	5.26
SAR	11.5	8.9	7.8	5.4	21.4	6.1	5.9	6.5
LAB ANALYSIS								
Inorganic (mg/L)								
Hardness	2.20	3.00	4.95	5.70	1.15	10.9	10.4	41.2
Ca	21	29	40	52	13	110	113	394
Mg	14.0	18.8	35.8	37.7	6.1	65.6	57.7	261.2
Na	278.3	250.7	280.6	211.6	372.6	328.9	310.5	680.8
HCO ₃	773.5	783.9	601.5	544.1	937.0	435.5	624.6	413.0
Cl	6.2	6.2	17.7	29.2	11.5	10.6	5.3	19.5
SO ₄	62.4	45.6	326.4	278.4	40.8	840	652.8	3096
K	3.5	3.1	2.7	3.5	6.3	4.3	4.7	12.1
NO ₃ -N	0.07	0.5	1.7	0.9	0.3	5.7	0.07	0.7
TDS (mg/L)	772	742	1010	863	943	1610	1450	4680
Metals (mg/L)								
Fe	0.27	0.23	0.10	0.04	0.96	0.03	0.04	0.74
Mn	0.07	0.11	0.03	0.09	0.07	0.04	0.18	0.73
Cu	0.01	0.01	0.01	0.01	0.04	0.01	0.02	0.02
Zn	0.02	0.01	0.01	0.01	0.05	0.01	0.01	0.04
Pb	0.02	0.02	0.04	0.04	0.04	0.07	0.07	0.10

Organic (mg/L)

COD	30	20	30	20	20	10	10	20	79
-----	----	----	----	----	----	----	----	----	----

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1985-06-11)

Well Number	Site 7		Site 8		Site 9A		Site 9B	Site 9C	Site 9D	Site 9F	Site 9G
	Piez1	Piez2	Piez1	Piez2	WTW	Piez	WTW	WTW	WTW	WTW	WTW
<u>Lab Data</u>											
pH	8.12	8.21	8.16	8.13	8.28	7.45	7.78	7.70	7.19	7.09	7.58
EC (mS/cm)	5.20	4.73	3.35	3.51	3.81	3.45	0.81	1.27	5.82	6.84	2.85
SAR	3.1	3.4	2.3	1.0	2.9	2.9	0.8	1.1	3.0	1.4	2.4
<u>LAB ANALYSIS</u>											
<u>Inorganic (mg/L)</u>											
Hardness	62.0	51.6	36.6	47.4	38.8	34.5	8.20	13.4	69.6	108.0	29.0
Ca	420	464	308	508	316	274	72	68	572	570	230
Mg	498.2	345.1	257.6	267.3	279.5	252.7	55.9	121.5	498.2	965.9	212.6
Na	393.3	400.2	225.4	117.3	289.8	278.3	39.1	66.7	409.4	246.1	209.3
HCO ₃	347.1	554.5	571.0	430.1	1071.8	563.0	384.3	604.5	730.8	1316.4	481.9
Cl	47.0	7.1	60.3	2.6	15.1	60.3	2.6	2.6	310.2	70.9	8.9
SO ₄	3432	2904	1694.4	2160	1704	1728	175.2	273.6	3144	4440	1440
K	13.7	12.5	4.7	9.0	8.6	5.5	6.6	2.7	14.5	5.1	6.6
NO ₃ -N	4.1	0.2	1.5	0.6	0.07	0.07	0.2	5.1	0.07	1.6	0.07
TDS (mg/L)	4990	4410	2840	3280	3170	2880	542	855	5310	6950	2340
<u>Metals (mg/L)</u>											
Fe	0.08	0.10	0.19	0.07	0.42	1.19	0.05	0.10	2.65	0.83	0.19
Mn	0.44	1.08	0.05	1.18	0.49	0.98	0.48	0.03	0.49	1.62	0.26
Cu	0.02	0.02	0.02	0.02	0.01	0.01	-	0.01	0.02	0.03	0.01
Zn	0.04	0.03	0.02	0.03	0.06	0.07	0.04	0.14	0.03	0.07	0.06
Pb	0.10	0.12	0.06	0.08	0.08	0.06	0.04	0.04	0.12	0.14	0.06
<u>Organic (mg/L)</u>											
COD	40	30	59	10	68	50	40	20	205	127	29

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1985-06-11)

Well Number	Site 10				Site 11(A)				Site 13			
	WTW	WTW*A	PIEZ1	PIEZ2	WTW(A)	PIEZ1	PIEZ2	PIEZ3	PIEZ3	WTW	WTW	WTW
<u>Lab Data</u>												
pH	7.92	8.02	7.92	7.71	7.20	7.71	8.05	7.87	7.87	7.48		
EC (mS/cm)	2.15	2.54	2.57	4.72	1.47	2.32	1.23	3.28	3.28	2.48		
SAR	1.5	1.8	2.1	3.5	1.2	1.8	1.6	0.9	0.9	0.8		
<u>LAB ANALYSIS</u>												
<u>Inorganic (mg/L)</u>												
Hardness	23.2	27.1	26.3	52.2	14.8	24.0	11.1	46.8	46.8	30.5		
Ca	254	234	170	440	172	268	128	496	496	380		
Mg	127.6	187.1	216.3	366.9	75.3	128.8	57.1	267.3	267.3	139.7		
Na	115.0	154.1	177.1	407.1	78.2	147.2	87.4	101.2	101.2	75.9		
HCO ₃	378.2	407.5	455.7	501.4	215.9	430.7	434.3	436.8	436.8	400.2		
Cl	20.4	37.2	32.8	7.1	8.9	22.2	4.43	25.7	25.7	14.2		
SO ₄	1008	1238.4	1214.4	2928	676.8	1056	364.8	2078.4	2078.4	1248		
K	3.9	1.95	1.2	10.6	3.1	5.5	5.1	10.6	10.6	8.2		
NO ₃ -N	0.6	0.1	0.3	0.1	0.1	0.1	0.3	0.07	0.07	0.07		
TDS (mg/L)	1720	2050	2040	4410	1120	1840	862	3190	3190	2080		
<u>Metals (mg/L)</u>												
Fe	0.08	0.09	0.16	0.61	0.08	0.11	0.03	0.12	0.12	0.15		
Mn	0.07	0.13	0.09	0.88	0.26	0.98	0.04	0.25	0.25	0.15		
Cu	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02		
Zn	0.02	8.1	0.03	0.06	42.6	0.17	0.05	0.80	0.80	25		
Pb	0.06	0.06	0.06	0.10	0.06	0.06	0.04	0.10	0.10	0.08		
<u>Organic (mg/L)</u>												
COD	29	49	20	49	137	29	10	10	10	39		

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1985-06-11)

Well Number	Site 14			Site 20			Site 21		
	WTW	PIEZ2	PIEZ3	PIEZ4	WTW	PIEZ1	PIEZ3	PIEZ4	WTW
<u>Lab Data</u>									
PH	8.3	8.4	8.4	8.15	8.6	8.1	8.1	7.9	7.9
EC (mS/cm)	1.70	5.85	1.63	5.53	4.85	2.24	1.81	2.53	3.6
SAR	8.4	10.9	7.9	10.0	11.3	4.2	4.8	5.7	4.8
<u>LAB ANALYSIS</u>									
<u>Inorganic (mg/L)</u>									
Hardness	5.25	31.0	5.45	31.5	21.8	15.2	10.5	14.8	28.0
Ca	58	356	58	374	204	153	113	163	278
Mg	28.6	160.4	31	155.5	140.9	91.7	58.9	80.8	171.3
Na	312.8	986.7	299	910.8	857.9	269.1	253	358.8	411.7
HCO ₃	496.5	497.8	596.0	752.1	546.6	467.9	575.2	538.0	456.3
Cl	16.0	4.4	9.7	4.4	21.3	15.1	6.2	8.0	45.2
SO ₄	504	3120	403.2	2880	2352	936	595.2	1046.4	1838.4
K	3.5	8.2	3.9	8.2	1.6	3.9	3.9	4.7	8.2
NO ₃ -N	0.6	0.07	0.4	0.07	0.14	0.4	0.07	0.07	0.4
TDS (mg/L)	1170	4890	1110	4710	3870	1700	1310	1930	2980
<u>Metals (mg/L)</u>									
Fe	0.06	0.04	0.11	0.41	0.42	0.10	0.22	0.12	0.97
Mn	0.09	1.15	0.10	1.05	0.56	0.18	0.38	0.50	0.60
Zn	0.01	0.04	0.01	0.02	0.02	0.02	0.01	0.02	0.39
Cu	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.02
Pb	0.04	0.07	0.03	0.08	0.08	0.07	0.04	0.06	0.08
<u>Organic (mg/L)</u>									
COD	10	29	10	10	127	10	10	10	214

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1985-06-11)

Well Number	Site 25			Site 26			Site 27					
	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW	PIEZ1	PIEZ2	PIEZ3	PIEZ4	WTW1	WTW2

Lab Data

pH	8.1	7.9	7.9	8.35	8.4	7.9	8.15	7.3	7.2	7.4	7.8	7.7	7.9
EC (mS/cm)	4.97	2.81	2.66	2.02	2.47	4.7	3.4	6.9	2.62	6.63	5.70	5.07	2.22
SAR	9.2	7.5	7.1	16.4	19.7	9.4	5.3	10.8	5.2	9.7	6.5	5.5	9.7

LAB ANALYSIS

Hardness	28.0	13.0	12.9	2.8	3.2	24.8	20.3	41.5	16.2	43.2	47.5	44.5	6.45
Ca	230	132	129	32	32	240	208	378	158	412	374	368	71
Mg	200.4	82.6	78.4	14.6	19.4	155.5	120.3	274.6	100.8	274.6	349.9	317.1	35.2
Na	793.5	448.5	414	446.2	545.1	759	388.7	1131.6	338.1	1035	729.1	600.3	400.2
HCO3	611.2	685.0	740.5	869.3	869.9	549.0	1058.4	1002.8	702.1	1002.3	507.5	478.2	511.2
Cl	12.4	13.3	10.6	14.2	19.5	32.8	28.4	16.8	12.4	18.6	3.5	3.5	4.4
SO4	2592	1070.4	926.4	398.4	600	2352	1104	3696	960	3552	3456	3000	787.2
K	3.5	4.3	5.1	3.1	2.7	3.9	11.7	11.3	11.7	10.2	3.9	3.5	3.9
NO3-N	0.07	0.4	0.07	0.07	0.03	0.07	0.07	0.07	0.07	0.07	1.4	3.15	0.28
TDS (mg/L)	4130	2090	1930	1340	1660	3810	2440	6020	1940	5820	5170	4540	1560

Metals (mg/L)

Fe	0.11	0.14	0.12	0.13	0.04	0.75	0.49	0.47	0.20	0.24	0.37	0.37	0.29
Mn	0.48	0.25	0.38	0.12	0.05	0.83	1.16	1.20	0.63	1.55	0.70	0.07	0.18
Zn	0.02	0.02	0.01	0.01	0.02	0.01	0.06	0.03	0.02	0.02	0.02	0.02	0.01
Cu	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.01
Pb	0.08	0.06	0.05	0.05	0.03	0.08	0.06	0.10	0.06	0.10	0.11	0.10	0.05

Organic (mg/L)

COD	39	19	39	29	19	49	116	58	398	58	39	29	20
-----	----	----	----	----	----	----	-----	----	-----	----	----	----	----

APPENDIX C2. GROUNDWATER CHEMISTRY ANALYSES (1985-06-11)

Well Number	Site 28	Site 29	Site 30	Site 33	Site 36	CDWS*
	WTW	PIEZ1	WTW	WTW	WTW	

Lab Data

pH	7.7	7.8	7.49	7.00	7.8	7.7
EC (mS/cm)	1.19	0.94	4.33	4.11	3.59	4.87
SAR	1.7	5.4	3.4	1.4	7.0	2.6

LAB ANALYSIS

Inorganic (mg/L)

Hardness	10.5	3.35	46.5	53.1	20.8	59.0	500.0
Ca	123	39	474	506	191	480	NE**
Mg	52.8	17.0	227.0	337.8	136.1	425.3	150.0
Na	89.7	161	381.8	165.6	519.8	310.5	300.0
HCO ₃	444.7	649.0	618.5	801.5	408.1	428.8	NE
Cl	3.5	4.4	21.3	24.8	13.3	55.8	250.0
SO ₄	340.8	28.8	2448	2160	1766.4	3048	500.0
K	2.7	5.5	7.0	9.8	7.0	13.3	NE
NO ₃ -N	0.28	0.07	0.07	0.07	0.28	0.07	10.0
TDS (mg/L)	833	588	3910	3600	2840	4550	100.0

Metals (mg/L)

Fe	0.14	0.91	0.20	122	0.18	1.42	0.3
Mn	0.03	0.14	0.18	2.27	0.10	7.0	0.05
Cu	0.01	0.01	0.02	0.02	0.01	0.02	1.0
Zn	0.02	0.01	53	1.46	0.03	0.03	5.0
Pb	0.04	0.03	0.08	0.12	0.06	0.11	0.5

Organic (mg/L)

COD	10	20	68	59	50	90
-----	----	----	----	----	----	----

* CDWS - Canadian Drinking Water Standard
 ** NE - Not Established



N.L.C. - B.N.C.



3 3286 10163099 0